ENGINEERING and MINING JOURNAL.

VOL. XXVII., NO. 4.

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SUBSCRIPTION PRICE, including postage, for the United States and Canada, $4 per annum ; $2.25 for six months ; European countries, including postage, $5.00 = 20s. = 25 francs = 20 marks. South American countries, including postage, $6 = £1 5s. All payments must be made in advance.
REMITTANCES should always be made by Post-Office Orders or Bank Drafts on New York, made payable to THE SCIENTIFIC PUBLISHING COMPANY.

THE SCIENTIFIC PUBLISHING CO., PUBLISHERS,
27 Park Place, New York.

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TABLE FOR THE CONVERSION OF ENGLISH AND METRIC UNITS.

This table is based on the authority of RANKINE, and is correct to the fourth decimal place.

1 Meter = 3·2808 feet.
1 Foot = 0·3047 m.
1 Liter (vol. of 1 kilog. water) = 0·2202 gal.
1 Gallon (vol. of 10 lbs. water) = 4·541 liters.
1 Kilog. per sq. meter = 0·2048 lbs. per sq. ft.
1 Kilog. per sq. mm. = 1422·28 lbs. per sq. in.
1 Lb. per sq. in. = 703·0958 kilogs. per sq. m.
1 Gram = 15·4323 grs.
1 Grain = 0·0648 gram.
1 Kilogrameter = 7·2331 ft.-lbs.
1 Foot-pound = 0·1383 kgm.
1 Atmosphere = 14·7 lbs. per sq. in. = 10·333 kilogs. per sq. meter = 29·922 in. or 760 mm. of mercury = 33·9 ft. or 10⅓ meters water.
1 Kilogram = 2·2046 lbs. av.
1 Pound av. = 0·4536 kilog.
1 Deg. Centigrade = 5-9 deg. F.−32°.
1 Deg. Fahrenheit = 9-5 deg. C. + 32°.
1 Calorie (kilog. water raised 1° C.) = 424 kilogrameters = 3·9683 heat-units.
1 Heat-unit (lb. water raised 1° F.) = 772 ft.-lbs = 0·252 cal.

AMERICAN INSTITUTE OF MINING ENGINEERS—ANNUAL MEETING.

At the annual meeting of the Institute, held in Chattanooga, May, 1878, the rules were amended by changing the time of the annual meeting from the fourth Tuesday of May to the third Tuesday of February. The Council of the Institute has accepted the cordial invitation of citizens of Baltimore, and the next annual meeting will be held in that city. Due notice will be given of special arrangements for the meeting.

The usual election of officers will take place at this meeting, namely: A president, a secretary, and a treasurer, to serve each one year ; three vice-presidents, to serve two years ; and three managers, to serve three years.

Members are requested to give timely notice to the Secretary of their intention to read papers at this meeting. If the papers are presented in time, they will be printed and distributed in advance of the meeting.

The sixth volume of Transactions is in press, and will, it is expected, be issued the early part of February. THOMAS M. DROWN, Secretary.

THE COMSTOCK MINES AND THE SUTRO TUNNEL.

It is rather amusing to hear the Comstock mine-owners protesting against the action of the Sutro Tunnel Company in refusing to take the water from their pumps till the tunnel is ready for it, and complaining that Mr. SUTRO is not pushing the work of preparation with "due diligence," after their persistent efforts to prevent him from driving the tunnel at all.

They now threaten to force the bulkheads and deliver the hot water into the tunnel whether he will or not, and say that as no one could then live in the tunnel, the bulkheads could not be rebuilt.

We believe that even the Comstock kings will find "honesty the best policy" in the long run ; and if they loyally set to work to carry out the terms of the agreement which secured the driving of the tunnel, they will find it the most profitable course, and—though this argument will probably weigh but little—the most honorable and honest one. So far as we are informed, Mr. SUTRO has no intention or thought of retiring from the management of his great work, and the success he has achieved in conducting it under the greatest difficulties seems to point to him as exactly the right man for the place. We have no doubt he will be as successful in obliging the parties "benefited" to pay the trifling tax allowed him by law as he has been in executing the work in spite of their opposition. The most sensible and profitable course for the companies would be to aid Mr. SUTRO to secure promptly what the law allows him, and thus hasten the time when the immense benefits of the tunnel may be made available, rather than to indulge in the expensive luxury of lawsuits in which they would certainly eventually be defeated.

SHIPMENTS AND PRODUCTION OF ANTHRACITE COAL IN 1878.

The following are the shipments and the entire production of anthracite coal in 1878 as compared with 1877, according to Mr. JOHN H. JONES, Accountant of the Anthracite Board of Control :

	1878. Tons.	1877. Tons.
Philadelphia & Reading RR. Co	5,101,044	6,842,105
Lehigh Valley RR. Co	3,398,717	4,511,331
Central RR. of N. J	2,263,300	2,837,500
Delaware, Lackawanna & Western RR	2,180,672	2,089,523
Delaware & Hudson Canal	2,045,041	1,918,617
Pennsylvania RR	1,362,674	1,530,594
Pennsylvania Coal Co	955,462	1,118,011
	17,306,910	20,847,681
Total shipments in 1878, as above		17,306,910
Add shipments to foreign points and Pacific Coast of United States		20,219
Add coal mined by Erie Railway interest		278,132
		17,605,361
Adding to this the consumption at the mines and coal not reported		1,094,639
Total production, gross tons		18,600,000

These figures are somewhat greater than those we gave in our Review of the Coal Trade on January 4th, some further reports having been since received.

THE NATIONAL SURVEYS.—I.

The plan proposed by the National Academy of Sciences for the organization of the National Surveys seems less likely than we had expected to meet with the favor of Congress. It has aroused lively opposition in two very different quarters—from the Engineers on one hand, and from the country surveyors on the other.

The Academy was required "to take into consideration the methods and expenses of conducting," etc., etc., and "to report to Congress as soon thereafter as may be practicable, a plan for surveying and mapping the Territories of the United States on such general system as will, in their judgment, secure the best results at the least possible cost," etc. The Academy's report, recognizing the paramount importance of the land-parceling surveys, nevertheless does not consider at all the relative cost of different systems of conducting them, but recommends the reference of that subject to a commission, to consist of the Commissioner of the Land Office, the Superintendent of the proposed Coast and Interior Survey, the Director of the proposed United States Geological Survey, the Chief of Engineers of the Army, and three other persons. In other words, the Academy, being required to report a plan, reports as the best plan it can devise, the creation of a commission to report a plan. This feature of the report has been forcibly criticised by General HUMPHREYS, the Chief of Engineers, and General COMSTOCK, the Engineer officer in charge of the Lake Survey. But we think the Academy was wise in thus declaring itself incompetent to determine the details of methods and cost.

The question naturally arises, whether the Academy was competent, then, to determine any thing—whether it should not have recommended the reference of the whole subject to an expert commission. If it could not say how the land-parceling surveys should be executed, how could it wisely decide what department should direct them? To this question we can only reply that the scheme of organization recommended by the Academy seems to us better than nothing, and we think that under it the proposed commission could develop a practicable plan of land-parceling surveys. At the same time, we repeat that we should prefer to see the scientific and topographical surveys placed under the War Department, and the land-parceling surveys left under the Interior Department ; and we do not adopt the Academy's view, that the latter "must be based upon a single, rigid, geodetic foundation." That would be very pretty, but it is not necessary, and it can not be done.

We have, therefore, nothing to add to the views heretofore expressed by us on this subject, except that the vigorous criticism already elicited by the Academy's plan indicates that it will not be quietly accepted as a compromise by all parties ; and, that being the case, a more thorough general discussion is in order. There appears at the outset a decided contradiction as to the cost of the Coast Survey method of triangulation—General COMSTOCK putting it very high and Superintendent PATTERSON very low. Both parties being undoubtedly honest in their views, the discrepancy must be due to a difference in the way of calculating the cost. But, since the Academy has recommended no particular method, this part of the debate strikes us as premature.

THE RICHMOND IMBROGLIO.—II.

METALLURGICAL PRACTICE AT THE RICHMOND WORKS.

The first point of metallurgical importance in the recent pamphlet of the Managing Director of the Richmond Company concerns the consumption of fuel in his "hydrocycles," or water-jacketed furnaces. In the report of Mr. EILERS, the form of the water-jackets is criticised, and a better form, practically proved in other localities, is recommended. Mr. PROBERT does not understand the criticism at all, but, quoting (p. 23) from RAYMOND'S report of 1868, where the improved form is praised, coolly appropriates that praise to his own form. And on pp. 15, 16, 17, 20, 21, and 22, he introduces tables to show that the water-jacketed furnaces consume less fuel per ton of ore than stone furnaces! Every metallurgist knows that this is an absurd proposition. As Dr. RAYMOND says, in the very extract triumphantly quoted by Mr. PROBERT (p. 23), "there is undoubtedly a loss of heat in such appliances." The advantage of the jackets, *where fire-proof materials are dear*, is undeniable; but it amounts to little or nothing at Eureka, where fire-proof "pancake stone" is cheap. Certainly lead-smelting statistics which show water-jackets to *save fuel* are simply worthless. But, after the peculiar revelations concerning the difference between the official and the private statements of the Richmond subordinate officials, we could hardly be expected to accept any thing from them as trustworthy, until we had been satisfied to which category it belonged.

The question of pressure of blast suffers a characteristic muddling. We are told that Mr. EILERS probably did not consider the altitude of Eureka, or the size of the tuyeres employed, when he recommended a lower pressure; and that the experiment of a lower pressure has been tried, with unfavorable results, the product being diminished one tenth. But Mr. EILERS recommended the reduction of the pressure to ⅛ inch of mercury, explicitly in order to reduce the quantity of flue-dust; and even if the capacity per diem were reduced thereby, the profit might be increased. The capacity, however, need not be reduced, except by incompetent management. Mr. PORTER, of the K K works, in the same district, uses only ½ to ¾ in. mercury pressure of blast, and maintains, nevertheless, a higher capacity than the Richmond, his furnace being smaller, and his "altitude" equally awful.

It is hardly worth while to mention, in passing, the statement of dimensions, given on p. 26, to contradict Mr. EILERS, and dated six months later than the measurements which Mr. EILERS partly made in person, partly received from the very official who now furnishes a new set. Whether the minds of men or the linings of hearths suffer the more rapid alterations, it is bootless to inquire.

On p. 29 we have a description of the method of sampling practiced at the Richmond works. It is sufficient to say that the furnace-cars hold about 1500 lbs., and that the samples are taken "all over the surface of the filled car." This is *superficial* work, with a vengeance! The average value of an entire car-load is deduced from the value of the layer last dumped upon it. It is too lovely for any thing to read how carefully the random samples thus scraped together are subsequently mixed, quartered, crushed, sampled again, powdered, spread on oil-cloth, thoroughly mixed, and assayed, if needed, in triplicate. Unfortunately, all this exactness afterward does not counterbalance the looseness of the first step. The process amounts simply to this: Guess at a fair sample, and then determine to the fraction of a milligram how much you guessed. We need not say that there is one way in which a fair average can be obtained at the furnaces. Every tenth—certainly not less than every twentieth—shovelful of ore should be reserved for quartering, as the cars are loaded. At the Richmond mines, something of this kind is professedly done; but the first sample is only about 75 lbs. from 5 tons, or one shovel in 133. This is not enough for a fair average. And moreover, if we may trust Mr. RICKARD'S account, the lump ore and the fine are separated, and samples are taken of each. Then the cars carry the ore to the furnace-bins, which hold 1000 tons. The ore sampled at the mine is dumped into the top of these bins, and the ore sampled at the furnace is drawn from the bottom. Mr. RICKARD says the mine samples are taken "to check the sampling at the furnace." Whatever the altitude of Eureka may require, we can not recommend this system as trustworthy to the profession at large.

On the 34th and following pages, the subject of the flue for catching flue-dust is considered. The Richmond works have for this purpose a flue 800 feet long, which was described by Mr. EILERS in Dr. RAYMOND'S report of 1875, and praised as a step in advance. Experience has shown that it still loses large quantities of flue-dust, as any one may indeed see who looks into the chimney. Mr. EILERS has added to the flue at the Germania works in Utah certain improvements, which are found to obviate this loss completely. They consist of condensing-chambers with interior partitions, upon which the fumes are forced to impinge. All metallurgists of experience know that this is a most compact and effective device; and Mr. EILERS, in his late report, recommended it to the Richmond company as an improvement. The manner in which the Managing Director treats this recommendation is characteristic. He cites the Germania flue, which *has* the condensing-chambers, as a copy of his own, which has them *not;* he complains that the Eureka Company "adopted" the plan of a flue (which is an immemorial device) "without acknowledgment to him"; and he quotes from PERCY'S Metallurgy a passage in which an entirely different kind of condensing-chamber is condemned, to show that the kind recommended by Mr. EILERS from actual experience would not be successful! This very passage, by the way, says that "where lead-smoke *rubs on the sides of flues*, there fume is most copiously deposited;" and thus in reality approves the principle of condensing-chambers with partitions—a principle which has proved effective in a far more difficult application—namely, to the vapors of quicksilver. Even old AGRICOLA wrote in 1550 (*De Re Metallica, Liber Nonus, p.* 334), "*Nam plumbum calore ignis resolutum et in cinerem mutatum, atque lapilli minutuli cum fumo evolantes in camera remanent, aut ad laminas æreas qui sunt in camino adhærent.*" Lead-smelters desirous of saving their flue-dust need not be hindered from adopting improved condensing-chambers by any theory or practice emanating from the Richmond works.

The next topic of general interest is the use of litharge in the shaft-furnaces. One reason given for building the Richmond refinery was to obtain a supply of litharge for this purpose. Mr. PROBERT wrote, in 1875, to Mr. RICKARD, "You must never forget that the only justification for placing the refinery at Eureka was the *known* want of lead in the ores of the district, and which we proposed to *buy* and *smelt* largely." There is, of course, no doubt that litharge is beneficial as an addition in the shaft-furnace to ores deficient in lead. But in any given case, the question to be settled is, whether litharge is necessary or only beneficial; and, if the latter, is it worth what it will cost to obtain it? Mr. EILERS stated in the Commissioner's Report of 1875 exactly what benefit was expected from the use of litharge in the Richmond furnaces. Dr. RAYMOND mentioned in the report of 1872 the metallurgical principle, "the more lead in the charge, the less of the noble metals will go into the by-products." Neither of these utterances, which Mr. PROBERT now flourishes triumphantly, contradicts the declaration of Mr. EILERS'S report to the Richmond committee, that litharge is not necessary to smelt their ores. If it had been necessary, it need not have been manufactured by running at a loss a whole refinery. And if this was, as Mr. PROBERT once wrote, "the only justification for placing the refinery at Eureka," then that measure was unjustifiable.

We must notice in passing a remarkable statement signed by Mr. RICKARD (p. 42), referring to a former statement made by him to the Committee, about the successful smelting of "Jackson" ore (15 per cent lead) without the use of litharge. Mr. EILERS, says Mr. PROBERT, "omits to state that this ore required the addition of a large amount of a special flux to get it through the furnaces, and that, moreover, the apparent loss in lead was so abnormally small" [only 8 per cent!] "that it could not be accepted as correct." And Mr. RICKARD obediently certifies accordingly. But if Mr. RICKARD, from whom the whole record came, "omitted to state" these facts, why should not Mr. EILERS omit them also? And if Mr. PROBERT thinks a large loss in lead is the sign of normal smelting, and small losses can not be accepted as correct, what is the use of any experiments? But on looking further, we find that the "special flux" required by this ore was—*speiss!* Now, speiss (or the mixture of matte and speiss, which locally goes by the latter name) has always been a waste product at Eureka. It is thrown away as a dead loss. If it really was used, as Mr. PROBERT and Mr. RICKARD say, as a special flux for the Jackson ores, the novelty of this utilization of the sulphide and arsenide of iron would entitle those gentlemen to the laurels of public benefactors. But in that case, the proposal to use costly litharge would be truly ridiculous. The "special flux," to be had *gratis*, would be the thing. Alas! it is only at great altitudes that such rare behavior on the part of speiss can be expected, and even then, under "abnormal" circumstances only. It must be "speiss from the Richmond ore," and it must be certified to, as an afterthought, by Mr. RICKARD (under a pressure not usual in high altitudes), otherwise it will not work!

Mr. PROBERT takes frequent occasion to sneer at the practice of the Germania works in Utah. It would become him better to study the causes of a success unsurpassed in any country, and unparalleled in this. The rival smelters of Utah can tell him that these works manage to run and make money when all the rest are losing money. Whether he likes it or not, the figures given by Mr. EILERS in 1877, from the books of this concern, were correct, and have been excelled since. The operations of last year resulted in a *plus* of lead, silver, and gold; although the sampling of ores in Salt Lake is more carefully and correctly done than anywhere else, so far as we know. This gain over the assay-values is due to the closer work in furnaces as compared with fire-assays—a fact not unknown to metallurgists, whatever Mr. PROBERT may think about it.

We do not pause to mention more than a fraction of the passages we have noted in Mr. PROBERT'S speech and pamphlet, as indicating the nature of his metallurgical reasoning. One further sample must suffice.

A very good test of the management of furnaces is their economy of fuel. Judged by this criterion, the Richmond furnaces have been badly managed. Obviously, the best comparison that could be made is with

the Eureka furnaces, which smelt exactly similar ores, and even at nearly the same "altitude," being only a little way down the street from those of the Richmond Company. According to the published reports of both companies, the Eureka cost of fuel per ton of ore smelted for the year 1876-7 was £1 13s., and that of the Richmond £2 11s., representing per ton of ore 42·5 bushels of charcoal (at 30 cents per bushel) or 36·12 per cent of the weight of ore.

Mr. PROBERT claims a considerable improvement since that time; and if there has been any change, it must have been an improvement. But he proceeds to try to break the force of the contrast between his works and his neighbors', and to discredit the condemnation pronounced upon the former by Mr. EILERS, by quoting from Dr. RAYMOND'S reports of 1873 and 1875, the statistics of various works in this country and Europe, some of which show a higher percentage of fuel *to the ton of ore smelted* than that above mentioned. Now, every metallurgist is aware that the true test of management is the fuel *per ton of charge*, that is, of ore *and flux*. At the Richmond works no flux is needed (except a couple of shovelfuls of slag); hence the fuel per ton of ore is a fair measure; and the Eureka being similarly situated, the direct comparison is fair. But in judging the economy of other works, the charge, not the ore only, must be taken as a basis. In this way we may consider the instances cited by Mr. PROBERT (p. 66):

Works.	Per cent of fuel. Per ton ore.	Per ton charge.
Miller, Salt Lake	28·8	25·68
Saturn, "	32·0	20·0
Winnemuck, "	47·2	24·9
La Pise, France	30·0	22·7
Clausthal, Hartz	39·99	15·0
" (Kast furnace)	61·2	20·77
Freiberg, Saxony	33·6	14·4

Mr. PROBERT gives, for comparison with the 36·12 per cent of fuel used at the Richmond works, the first of these columns, and not the second, although the figures of both are given in every instance in the report from which he quotes! And on this shamelessly garbled statement he remarks:

"Here we find, according to Mr. EILERS'S own showing, the consumption of fuel at some of the most famous lead-smelting works of Germany and France, as well as at Salt Lake, to have been much higher than at the Richmond works. And I leave him and his friends of the Committee to reconcile as they can the above with the statement he makes in the report to them, that 'the consumption in the Richmond furnaces was out of proportion to any he ever had occasion to see or be informed of.'"

Mr. PROBERT'S economy can not be questioned, after that specimen; but, though exceedingly great, it is applied in the wrong direction. He should use more candor—and less charcoal.

There is plenty more of the same sort of facts and quotations and arguments in the pages before us. But we find nothing of general importance; and we pause, at least for the present, in our analysis. It is sufficiently demonstrated that neither Mr. PROBERT'S opinions and quotations, nor the statements of his subordinates, while they are his subordinates, can throw any light upon the problems of practice. *

PERSONALS.

Our Readers are invited to send us Items for this Column.

Mr. LOVELAND, President of the Colorado Central RR., has come East to get capital to build his road up to Leadville.

There is a rumor that FLOOD, FAIR & CO. are negotiating with Senator CHAFFEE for the purchase of his Leadville interests, and, if they secure them, will organize a company in San Francisco, but place the stock in New York, the Nevada Bank making transfers here.

Prof. N. P. HILL, of the Boston & Colorado Smelting Works, has been elected United States Senator from Colorado, in the place of Senator CHAFFEE. Colorado is making rapid strides forward in a political as well as a mining sense; and if Prof. HILL "runs" its politics as well as he has done the famous smelting works he has built up, there will soon be a moral dividend to declare, instead of the usual assessment.

Our esteemed contemporary, the Hazleton *Sentinel*, publishes weekly the most reliable table of anthracite coal production of any of our provincial exchanges; but it seems somewhat churlish in so good a paper to forget every week to say that this table is taken directly from the ENGINEERING AND MINING JOURNAL, and it seems a little worse than churlish to credit other papers with what it takes from our columns.

Mr. WILLIAM M. LENT, the chief owner of the Bodie and some other mines in the Bodie district, has come East for the purpose of placing the Standard mine on this market. Mr. LENT considers the Standard the richest gold mine ever found in America, and every one is familiar with the statement that it has paid no less than sixteen regular monthly dividends of $1 each without intermission. All the good mines will soon be here.

The most wonderful mineral discovery yet made is that of immense beds of mineral wax, in Southern Utah and Arizona, specimens of whi ch we have before us. We shall shortly give full particulars of this remarkable find, which, in the opinion of some competent experts, is of greater importance than was that of petroleum in Pennsylvania. Prof. HENRY WURTZ was, we believe, the first to identify this peculiar substance as Zietriskisite, or the Romanian mineral wax. It differs from paraffine, which name has sometimes been given to it, by being insoluble in ether, and in other respects. In European countries, this curious mineral is found in small quantities; but, as is usual in America, we have here found it in beds said to be as much as twenty feet in thickness, and extending over many square miles in area.

THE NEW SILVER ISLET MINERALS.

Dr. Wurtz made to the New York Academy of Sciences, the 13th inst., a first communication on some of the new species he has recently found among the ores of the great new bonanza of the Silver Islet Mine in Lake Superior.*

Huntilite.—Of this new species there are two varieties, one, the most abundant, very dark slate-gray or almost black in color, entirely dull in its natural condition, often porous and crumbly, amorphous (or at least crypto-crystalline), and much richer in silver than the other variety. The latter occurs diffused more or less throughout the calcitic gangue, and is, apparently, strongly crystalline, showing a much lighter slate-color, with bright cleavages. The sample of the crystalline variety which was analyzed contained, in the first place, about 20 per cent, by weight, or more than half the bulk, of calcite (which was nearly extracted by acetic acid before analysis); the whole mass showing two systems of cleavages, one rather irregular and large, belonging to the calcite, and therefore obliterated by acetic acid; the other, small and brilliant, remaining after removal of the gangue, and proper, therefore, to the huntilite itself.

These two varieties appear to be susceptible of computation, according to the accepted theories of quantivalence, to the same general formula, and are, therefore, considered by the analyst, notwithstanding the important differences in their percentage composition, to belong to the same species.

The composition of these two varieties is as follows:

METALS.	Crystallized Huntilite. Percentages.	Equivalents.	Amorphous Huntilite. Percentages.	Equivalents.
Arsenic	23·99	100·0	21·10	100·0
Antimony	4·25	11·0	3·33	10·0
Mercury	1·11	1·5	1·04	2·0
Sulphur	1·81	17·5	0·78	8·5
Silver	44·67	129·5	59 00	194·5
Cobalt	7·33	38·5	3·92	23·5
Nickel	2·11	11·5	1·96	12·0
Iron	8·53	47·5	3·06	19·5
Zinc	3·05	14·5	2·42	13·5
Combined water	0·33	.....	0·19	.....
Silicate gangue	0·55	.....	0·88	.....
Calcite gangue	1·10	.....	2·35	.....
	98·83	.....	100·03	.....
Density at 0°C. the gangue deducted	6·27	... ..	7·47	.....

Quantivalent Constitution.—The mercury in huntilite is not present as cinnabar, but as *amalgam*, as proved by its sublimation in the metallic form in the closed tube. It is also readily proved that the sulphur is not present as *blende*, *phyrrhotine* or other monosulphide, from the non-evolution of H_2S by hydrogen-acids. It is believed, therefore, that the sulphur should be computed out as *pyrites*.

Deducting then the Hg as Ag'_2Hg'', and the S as $Fe''''S''_2$, and regarding the Co,Ni,Zn, and remainder of the Fe, as dyadic or equivalent to twice as much Ag', we get for—

	In crystalized huntilite.	In amorphous huntilite.
As + Sb	111.	110.
Sum of the other metals by quantivalents	332.5	319.
Or.	$As.Ag_{2\cdot 99}$	$As.Ag_{2\cdot 90}$

Both the analyses apply, therefore, to one compound, which is strictly normal, according to quantivalence, with As as a triad: $As'''Ag'_2$.

Physical and Chemical Characters.—The huntilites possess some degree of *sectility*, and of malleability under the hammer, and may be designated as sub-sectile and sub-malleable. In this respect they differ from the antimonurets of silver or discrasites, which are brittle. They are unlike the discrasites in color also, being of a more or less dark slate-color, and giving streaks of this color on unglazed porcelain, while discrasites are tin-white, with dull jet-black streak. On ground glass, however, the streak of huntilite has a lustrous *bronze-color*, particularly that of the amorphous variety, while discrasite streaks, on these surfaces also, are black.

The hardness of huntilite, free from gangue, is about 2·5. When rubbed with a knife-blade, a brilliant polish or burnish appears. Heated in a closed tube, air being absent, a ring of metallic mercury forms, but no further change appears. The mineral has now, however, become insoluble, or partly so, in nitric acid. In the open tube, a high temperature causes but a slow evolution of arsenic, but protracted roasting *at a lower temperature* gradually forms two rings, one of metallic arsenic, the other of arsenious-acid crystals. On charcoal, fumes of arsenic with strong odor appear, and after long blowing a difficultly fusible and difficultly malleable globule may sometimes be obtained, containing silver, with cobalt, nickel, and iron.

In nitric acid the mineral dissolves mostly with great readiness, leaving, however, an insoluble residue of silver-antimoniate. The most convenient method of analysis is to add directly, at this stage, an excess of HCl, which, while precipitating all the Ag as AgCl, takes up, with heat, all the antimony and arsenic, which may then be separated from the filtrate. Dilute sulphuric and muriatic acids, particularly the latter,

* See ENGINEERING AND MINING JOURNAL of December 21st, 1878, for description and illustrations.

when hot, dissolve huntilite slowly, with evolution of some arsenietted hydrogen; so that precaution is necessary to avoid poisonous effects.

Affiliations of Huntilite.—The most obvious of these are with the *discrasites* and *domeykites*. Most mineralogical authorities recognize discrasites as comprising at least two distinct species, constituted as $SbAg_3$ (this being coarsely crystalline), and $SbAg_6$ (this being fine-granular).

The domeykite series is as follows:

Domeykite, $AsCu_3$; algodonite, $AsCu_6$; whitneyite, $AsCu_9$. Of these, *whitneyite* comes, in some of its physical characters, nearest to huntilite, being described as malleable or sub-malleable by Genth.

Huntilite may be called either an arsenic-discrasite or a silver-domeykite, the latter probably with the greater propriety. In reality, however, it constitutes the first-discovered member of a new series of mineral homologues; and fills up a hiatus hitherto existing in our mineralogical system. In this regard, the fact that it comes from the new bonanza in such huge quantities that, if proper precautions be taken, all the cabinets in the world may be quickly and abundantly supplied, makes its discovery, as Dr. Wurtz claims, of very unusual importance and interest at the present time.

FLUCTUATIONS IN THE PURCHASING POWER OF GOLD.

The London *Economist*, of December 28th last, contains a very long but interesting editorial entitled, "Fluctuations in the Purchasing Power of Gold." We have room to make only brief extracts from it, and in doing this we select the parts which give little more than the scope and conclusions of the article:

"It is a fact which will scarcely be disputed that the purchasing power of gold is now considerably greater than it was in the three years 1872–3–4. This assertion may readily be corroborated by an appeal to the market prices of commodities then and now; and the result, which yields an average fall probably exceeding 20 per cent, will forthwith be ascribed to the existing great depression in trade, to over-production, and to the collapse of speculation after the years of inflation and mania. Although these have undoubtedly been potent causes operating to produce a fall in market prices, it is probable that others which it is now our purpose to consider have also contributed toward this great and general movement. If, as can undoubtedly be shown, market prices are, taking an average of a great number of commodities in daily use, from 10 to 12 per cent cheaper than in any of the years of depression which followed the panic of 1866, and from 8 to 10 per cent below those of 1859—the cheapest year of the series after the crisis of 1857—the conclusion is forced upon us that either (1) the present depression is far in excess of that which existed in those previous periods of depression; or (2) the world's productions are far more easily rendered marketable; or (3) there has been an increase of late years in the intrinsic worth of our unit of value, namely gold. Tracing prices further back, to the time of stagnation following upon the railway panic of 1847, we at length obtain a record of prices apparently cheaper than those at present existing, and in 1849, 'the cheapest year of the century,' the average of marketable commodities was probably somewhere about 7 per cent lower than at present. Consequently, either that depression was (1) more severe than this, and very much more severe than after 1857 and 1866; or (2) the world's productions were then more easily rendered marketable; or (3) the intrinsic worth of our unit of value was then much higher than after 1857 and 1866, and somewhat higher than it is now."

The writer, in fortifying the position which he takes that the value of gold has increased, cites the facts (1) that there has been a diminution in the supply of gold, there having been a reduction between 1855 and 1875 of about £9,000,000 per year in the product, and (2) that there has been a marked increase in the demand for gold by reason of the action of the German government, which it is estimated has increased the ordinary demand £53,000,000 in seven years, and the preparations for resumption by the United States, which have increased the demand on the world's stock and production £16,500,000 in ten years. We quote:

"These two requirements are thus shown to have absorbed £70,000,000 of gold in the past seven years—say, £10,000,000 a year—or decidedly more than one half of the world's production during this period. Currency reforms in the Scandinavian kingdoms and in other countries have likewise absorbed further exceptional amounts, and after making the usual deductions for the arts and jewelry purposes, it is probable that the balance of new gold left available for the maintenance of existing gold currencies has during the past seven years been reduced to about one third what it was in the previous decade, and to a far smaller proportion of the world's production of twenty years ago. At the same time all the principal banks in Europe have shown more and more eagerness to store gold in preference to silver. We have not space on this occasion to enter into details upon this point. Suffice it to say that on page 57 of the 'Commercial History and Review for 1877,' it was calculated that in the ten years then ended £82,650,000 of gold had been added to the cash reserves of the principal banks. Here is another large amount averaging £8,265,000 per annum; and if we add thereto less than another couple of millions annually for wear and tear of existing coinages and sundries, we can construct the following rough account, representing the world's annual average receipts and expenditure of gold during the past seven years:

YEARLY PRODUCTION.	
Average annual production	£19,350,000
German new gold coin exported (say)	1,500,000
Total	£20,850,000
Balance—annually withdrawn from previously existing gold in circulation	1,200,000
Total	£22,050,000
YEARLY APPROPRIATION.	
On German currency	£7,600,000
United States Resumption	2,400,000
Fine arts	2,000,000
Added to reserves in state banks	8,250,000
Wear and tear, other coinage reforms, and sundries (say)	1,800,000
Total	£22,050,000

The conclusions of the article are:

"We have not touched upon the question of the circulation of bank or statute notes in substitution for gold, nor upon other increased banking facilities, nor yet upon the growth of population in the past ten years. But the fact remains that commodities are much cheaper than they were ten and twenty years ago in periods of great depression in trade, and the same amount of gold—not silver—will buy more of such necessaries of life. Probably, therefore, gold has risen, while silver has fallen, as nations have competed for the one and discarded the other."

RAILROADS IN THE UNITED STATES SOLD UNDER FORECLOSURE DURING 1878.

We are indebted to a late number of the *Railway Age* for the following statistics, showing the railway mortality for the past year and previous years:

SOLD UNDER FORECLOSURE, JANUARY 1ST TO DECEMBER 31ST, 1878.

ROAD.	Miles.	Bonds and debt.	Capital stock.
Arkansas Valley	76½	$1,125,000	$1,520,000
Ashburnham	3	12,000	100,000
Baltimore, Philadelphia & New York	Unbuilt.	416,200	86,800
Billerica & Bedford	8½	25,000	39,700
Bridgeton & Port Norris	20½	400,000	300,000
Brownsville, Fort Kearney & Pacific	Graded.	320,000	518,000
Buffalo, Corry & Pittsburg	43	1,250,000	428,700
Chesapeake & Ohio	434	30,150,000	15,950,000
Chicago, Clinton & Western	9	350,000	.....
Chicago & Iowa	80	1,750,000	1,328,000
Chicago & Southern	20½	320,000	500
Chicago & Michigan Lake Shore	247	6,000,000	1,515,000
Cherokee	23	287,500	287,500
Columbus & Gallipolis	Partly graded.	60,000	45,000
Danville, Hazleton & Wilkes-Barre	43½	1,634,000	658,500
Detroit & Milwaukee	189	6,412,000	2,500,000
Erie	957	56,000,000	86,537,000
European & North American—N. B. Division	91½	1,500,000	550,000
Hackensack Extension	9	700,000	300,000
Indianapolis, Blooming'n & West'n—Main line	202	8,500,000	7,600,000
Iron Mountain, Chester & Eastern	43	854,600	1,000,000
Lake Erie, Alliance & Wheeling	19	138,000	221,000
Lake View & Collamer	8	63,000	70,000
Leavenworth, Lawrence & Galveston	146	9,000,000	5,000,000
Michigan Lake Shore	57½	1,028,400	4[illegible]0,000
Montclair & Greenwood Lake	40	2,500,000	3,000,000
Maryland & Delaware	54	1,000,000	50,000
Nashua, Acton & Boston	24	.....	1,000,000
New Jersey West Line	15	1,800,000	.....
New Orleans, Mobile & Texas	65	500,000	1,000,000
North & South of Georgia	12	300,000	412,500
Ohio Central	36	270,000	1,122,500
Ohio & Toledo (N. G.)	22	100,000	160,000
Ashtabula, Youngstown & Pittsburg	62	2,200,000	1,820,000
Omaha & Northwestern	47	618,000	100,000
Paris & Danville	103	2,500,000	1,610,000
Pensacola & Louisville	45	585,000	425,000
Port Royal	112	2,500,000	3,000,000
St. Louis Tunnel RR	3	2,000,000	100,000
Selma, Marion & Memphis	43	2,500,000	2,000,000
South Mountain	Graded.	1,016,000	582,000
Springfield & Northwestern	47	1,000,000	180,000
Utah Northern	80	500,000	500,000
Utica, Ithaca & Elmira	72	1,750,000	1,589,000
West Wisconsin	177½	6,500,000	5,000,000
White Water Valley	63	1,225,000	1,380,000
Wilmington & Reading (branch)	7	104,800	80,000
Wyandotte, Kan. City & N. W. (N. G.)	42	250,000	500,000
Total 48 roads	3,902	$160,014,500	$151,616,700
Total bonds, debt and stock	.....	.....	311,631,200

It appears from the above that at least 48 roads, with a length of 3900 miles, and representing nearly $312,000,000 of nominal investment, have, during the past year alone, been taken out of the hands of the original companies and turned over to new purchasers, generally the mortgage bondholders, who have been compelled to take the property and "throw good money after bad," in the hope of eventually saving something from the wreck. As for the stockholders, they seldom have any part or lot in the property thereafter, except that, if they live along the lines, they have the perpetual benefit of the existence of the roads, which is worth vastly more to the communities than the money which they have contributed. The non-resident proprietors, the "foreign capitalists"—including numerous widows and orphans—are the real and absolute losers.

The following statement summarizes the total sales under foreclosure during the past three years:

YEAR.	No. of roads.	Mileage.	Capital invested.
1876	30	3,846	$217,848,000
1877	54	3,875	198,984,000
1878	48	3,902	311,631,000
Three years	132	16,623	$728,463,000

This indicates that in three years alone over one seventh of the present railway mileage of the country, representing considerably over one seventh of the reported total capital investment, has passed through the final stage of bankruptcy.

A summary of receiverships appointed is given in the following:

YEAR.	No. of roads.	Mileage.	Capital invested.
1876	42	6,662	$467,000,000
1877	38	3,637	220,294,000
1878	27	2,320	92,385,000
Three years	107	12,619	$779,679,000

Deducting from the above list the roads which have since been sold, there still remain, as we figure it, of these enumerated receiverships, 76 representing 8586 miles, and $512,000,000 of apparent capital.

How many other roads which were placed in receivers' hands previous to 1876, still await sale we can not say. Our statistics go no further back, but the partial record of loss and ruin which they give is sufficiently startling and saddening. It is to be hoped now that the fearful storm is nearly over, and that bankruptcies and foreclosures that are hereafter to be recorded will be only the clearing up of the clouds and tempest.

SILVER CLIFF.

By Francis L. Vinton, M.E.

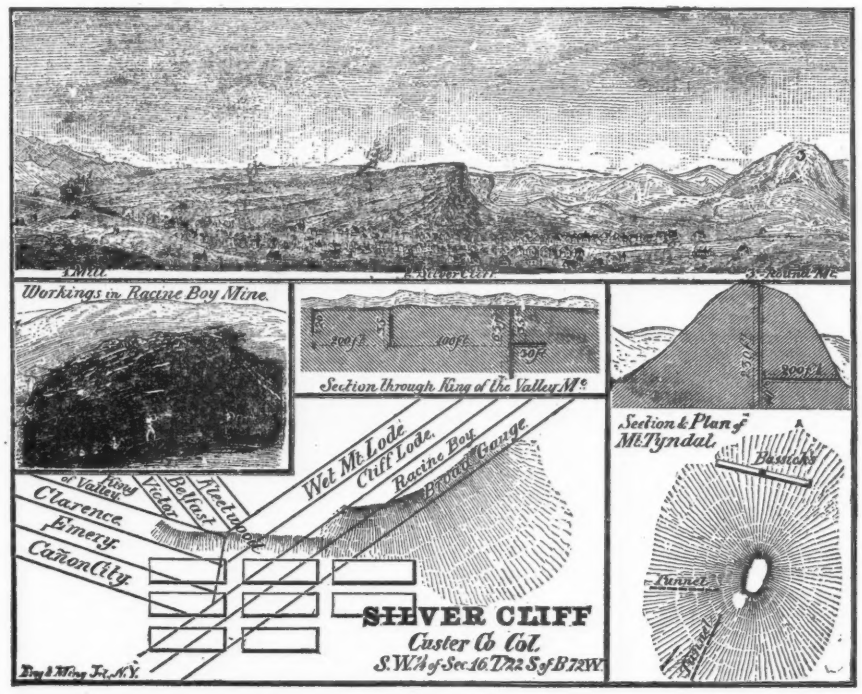
Silver Cliff is situated in the Wet Mountain Valley, at the foot of the Sangre de Cristo range, in Custer County, Colorado, about thirty miles southwest from Cañon City, and eight northwest from Rosita. Those who have prospected the Sangre de Cristo Mountains say, that upheaved here, on their eastern flank, are series of limes, conglomerates, and sandstones, followed by gneiss, in contact with the porphyry axis of the Sierra. The base of the Wet Mountain range shows nothing but gneiss. The Sangre de Cristo presents sharp peaks and outlines; but the undulating country and elevations to the east are well rounded. The valley across on the E.W. line through Silver Cliff is fifteen miles wide, sloping westward; in the middle, ledges of reddish gneiss crop up, dipping east; the rest of the area is one vast trachyte wash; all over which, detached buttes and cones protrude, that, so far as examined, regarding structure, resemble accumulations formed about hot springs. Several perforations by tunnel and shaft into Mount Tyndal, where is Bassick's mine, and the open cut on the Racine Boy, make manifest this appearance. The prevailing composition of the whole and every part is an agglomeration of porphyry boulders and breccia, cemented by trachytic mud, all of a yellowish tinge to white; sometimes tufa form; again, in places, kaolinized, and, near Silver Cliff, intersected by two considerable dikes of feldspathic glass like obsidian.

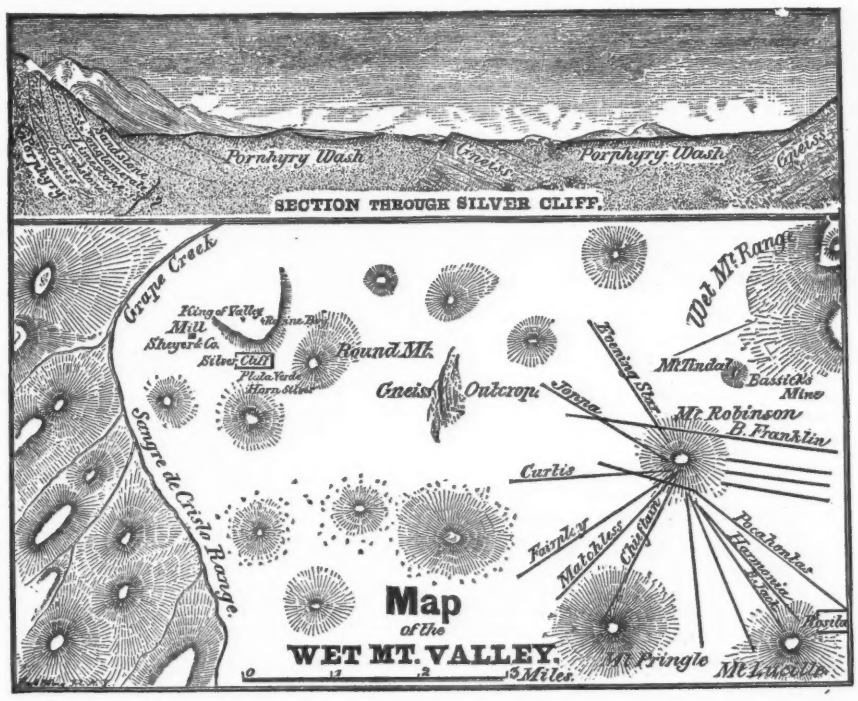
Agate, jasper, chalcedony, and the sulphates of lime and baryta are found in many of the prospects. There are hot and cold springs of sulphur, iron, and soda in every direction around, and on the Cliff itself two of the shafts emit steam incessantly. The metallic ores that came over with this porphyry wash seem to have settled on and in the interstices of the boulders and breccia, so that these are seen coated with iron oxide, often carrying silver, or with purer silver ore, some of which is fine chloride.

All the wash carries silver from one ounce to fifteen; but where concentrated till the agglomeration is seamy with ore, the deposit becomes sometimes of extraordinary richness, enhanced as it is occasionally by gold. There is no theory of prospecting this basin; that is, of forecasting probabilities bearing on the situation of pockets; nor is the bed-rock yet reached or known. The geological section I append is mostly hypothetical, or, at best from hearsay; it was difficult to study the surface at the season. Near Rosita there is a peculiar congeries of true fissures in the gneiss, bearing the usual sulphides and galena silver ores of the northern counties. If we may trust the plats, these lodes effect a decided radiation from one point—Mount Robinson: it is not doubtful that they with others will make the abiding mineral value of the valley.

The Silver Cliff itself is a hill of breccia two hundred feet high, broken away to a vertical scarp on the east: the town is built at its base. Springing into existence in September, 1878, it has now some four hundred buildings, including several good inns, a bank, and newspaper office; and though the population wanes in this weather, the summer will see four or five thousand people in the place. The nearest railroad depot is one of the Denver & Rio Grande, at Cañon City, thirty miles away; but a branch will soon take in the Wet Mountain valley via the Grape Creek Cañon. The precipitate energy with which our people build towns on, and railroads to, new mining sites looks like mad rashness; but how many are yet regretting their tardy confidence in Leadville. I am of opinion that great strikes, if not to equal Bassick's, will be made in the deposits of Silver Cliff next summer, and besides, am convinced that the lodes in the ranges are of excellent quality.

The first mine, I think, that fixed admiring attention on Silver Cliff proper was the Racine Boy, which to-day has no other shape than that of a rude quarry into the eastern exposure of the cliff. The cut lays open a face of pudding and breccia that at first glance appears stratified in curves, probably concretions, seamed throughout with rusty and black manganiferous iron, and occasionally penetrated with clots, net-work, and nuggets of horn-silver. There is nothing like a lode, of course, in this mine, nor any other near; and to sort its product to a high grade probably costs more than to extract it. The rock is worked with powder, and six or eight men are at present in employment there.





The King of the Valley is a more shapely mine, with three shafts and some drifting commenced. This work strikes no chlorides as yet, nor dark ore, but gets silver in some of the porphyry; it develops bands of kaolin, chalcedonies, and jasper; works with powder; fourteen men. The Horn-Silver mine is on Round Mountain; it furnishes good specimens of chloride, as also does the Plata Verde, on the same hill. The Silver Cliff, Belfast, Fleetwood, Wet Mountain, Clarence, etc., are plats on Silver Cliff, and good locations for luck. In the vicinity of Silver Cliff there is no timber; but to the east about three miles, it begins to clothe the hills, though sparsely. Good water is found about the place, but no power near. Scheyer, Dillingham & Co. have just completed their sampling mill, which stands half a mile out of town, northwest, and will be running in a few days. Its capacity is thirty tons, and they are the firm to fill it with ore. There are eduction works at Rosita and Cañon City. I visited Bassick's mine, five miles from Silver Cliff, on tiptoe with curiosity. It is as phenomenally rich as ever; and to see the interior, a chamber of boulders shelled with glittering ore, is a vision indeed. This pocket is now mined to 230 feet, and at bottom measures 40 by 20 feet, in cross-section; but, though a monster of wealth, it is becoming unwieldy to manage, and soon will tax the resources of mining engineering to secure the excavation. Dr. Munson, the engineer, is, however, arming for the task. A tunnel strikes the pit now at 190 feet, and at the intersection an engine will be established for further sinking; this remarkable ore-deposit is in a hill apparently altogether similar to those that surround it. It stands in the axial line, but not the center of the mound; and though several other claims on the site have been well prospected, nothing else of value has been found, only the concretionary structure evidenced, and in the clay and conglomerate layers, remains of branches, twigs, and leaves, such as originated the charcoal in the Bassick bonanza. Mr. Ottinger, a Chicago engineer, will place a diamond drill on Silver Cliff shortly, and interesting revelations may, therefore, soon be expected. The porphyry wash is not unlike that overlying at Leadville, and if there proves a concentration of ore on bed-rock at Silver Cliff, there will be mustering in hot haste and a riddling of the entire Wet Mountain valley.

ENCOURAGING THE EMIGRATION OF ENGLISH MINERS.—The North Wales Miners' Association has resolved to vote $34 to every member of the union who desires to emigrate to America, and $92 to emigrants to Australia. This is the most sensible action of a labor association we have had to record in a long time.

SILICON IN BESSEMER STEEL.*

By W. Hupfeld.

Translated by Dr. Thomas M. Drown, Lafayette College, Easton, Pa.

The attention of metallurgists has been repeatedly directed, during the last two years, to the *rôle* played by silicon in its combination with iron, especially in Bessemer iron and steel. The communications of Gautier on the production of steel free from blow-holes excited very general interest, indicating that in silicon and in various alloys of iron and silicon we possessed a method of securing solid steel ingots.

For steel castings, particularly of Martin steel, the efficacy of this method has been fully proved, and the greatest perfection has been attained at Terrenoire in making all kinds of castings, even hollow shot, perfectly free from blow-holes, as the exhibits at the Paris Exposition abundantly show. In Austria, this process has been in operation for a year and a half at the Martin works of the Southern Railway at Gratz, for the most varied uses and with the best results.

The effect of silicon on Bessemer steel for rolling, it has been claimed, is also favorable, and among others Dr. Müller, of the Osnabrück Steel Works, holds this view. The conclusion to which he comes (*Berggeist* No. 57, July 16th, 1878) is as follows: "The retention of manganese and silicon in Bessemer steel appears to have a *very favorable* influence on its tenacity and toughness, and it is much to be desired that this relation, particularly of the manganese in steel, should be more closely investigated." On this last point I have no opinion to give; but as to the effect of the silicon, our experience is opposed to the favorable opinion of Dr. Müller, and it may be, therefore, of general interest to make it known. I must premise that we have at Prevali a pig-iron rich in manganese, but free from sulphur and phosphorus, which is taken in a molten condition from the blast-furnace to the converter and is blown "direct," that is, the process is interrupted at the desired point of decarburization, and there is, consequently, as a rule, no subsequent carburization. All of my remarks refer, therefore, to a steel (or iron) in which phosphorus and sulphur have no influence, since their amount in the pig-iron seldom exceeds 0·02 per cent. For such a steel, the presence of silicon to a greater extent than 0·4 to 0·6 per cent is to be considered injurious, even though the injury to the steel be more or less pronounced according to the uses to which the steel is to be applied.

Primarily, silicon diminishes the weldability of the steel to such a degree that steel with 0·45 to 0·5 per cent of silicon is with difficulty welded, and that with 0·5 per cent can not be welded at all.

The consequence is, in the first instance, that the blow-holes are not welded together, but rather open on rolling, and the rolled product has a very defective exterior. In the case of rails, this is noticed on the foot, which is sometimes cracked on the edges, but generally is scaly and contains flaws, and the fine blue color is wanting, being replaced by a dirty, rusty brown.

Shafts, bars, beams, and angle-iron have scales on the surface; sheet-iron it is impossible to roll smooth, and knife, scythe, and sword-steel is imperfect on the edges with long cracks. These defects are noticed in making the ordinary cold test.

If a bar of soft steel of 20 millimeters section is bent together, a good weldable steel of about 4·25 per cent silicon will remain sharp on the edges and the whole bend will show a silver-gray color. Steel rich in silicon will appear, in proportion to the amount of silicon, brownish-red to dirty dark brown, and the angles will be scaly, but generally not cracked. After some practice, the amount of silicon can be tolerably well estimated by the color, and the greater or less amount of scale.

When the silicon exceeds 1 per cent, the behavior of the steel is quite peculiar. Not unfrequently large masses of the ingots melt out in the heating furnace, as if an easily fusible silicate had been formed, leaving deep holes sometimes extending quite through the ingots, which do not weld together afterward. When the silicon reaches 1·5 to 2 per cent, the Bessemer steel is unfit for welding or rolling, and falls to pieces generally under the hammer.

One would think, from the experience at Terrenoire, that steel rich in silicon never had any blow-holes, and that the above-mentioned difficulty in welding would never arise. This is, however, not the case with steel as high as 0·5 to 1·5 per cent silicon. Steel of this description has more blow-holes than any other, because it rises abnormally in casting. Ingots which are not at least 100 millimeters shorter than the molds can not be cast; for, in spite of the greatest haste in closing and wedging the mold, the steel overflows before this can be accomplished. In the ladle this is less noticeable, but on teaming the steel shows a peculiar pasty condition and separates often in flakes resembling a cold steel about to set. In reality, however, the steel has an excess of heat, and skulls in the ladle are great rarities.

Similar phenomena have been observed in Witkowitz in working pig-iron high in silicon (see Kerpely, the *Iron Ores and Iron Products of Hungary*). Here, too, the steel rose violently, and was also, during the blowing, thrown out of the converter in large quantities, which in Prevali has never taken place.

A still greater defect of steel high in silicon is its *brittleness*. Rails made from the softest steel, that is, with carbon from 0·12 to 0·15 per cent, broke frequently on being straightened cold when containing as high as 1 per cent silicon, and even with 0·75 per cent the ingots were with difficulty rolled. The resistance of such steel, when the carbon was at the lowest, was equal to hardest numbers of steel, so that it would have to be treated as a No. 4 when the carbon determined by the Eggertz test would indicate it to be No. 6.

The hardening test agrees in so far with the carbon test that it would be, as a rule, only one number higher than one would expect from the amount of carbon—a proof that silicon, in its hardening power, can but poorly replace carbon. The fractured surface of the steel is very fine-grained, of feeble luster, and with a tinge of yellow. A clean scaling in hardening does not take place. In working with pig-iron rich in manganese, it is noticeable that the silicon holds manganese in combination in the steel. We almost always find that a large amount of silicon in the steel is accompanied with a considerable quantity of manganese, although no definite relation between the two has been established. In proof of the above the following results may be cited:

Carbon. Per cent.	Silicon. Per cent.	Manganese. Per cent.	Hardness by Smith's test.	Remarks.
0·12	0·45	0·73	VI.	Not weldable.
0·14	0·57	1·08	VI.	"
0·15	0.50	1·07	VI.	"
0·17	0·28	0·42	VI.	Very good.
0·19	1·00	0·50	VI. soft.	Bad and brittle.
0·24	1·50	0·80	VI.	Could not be rolled.
0·26	0·10	0·25	VI. hard.	Very good.
0·33	0·03	0·20	VI. "	"
0·41	0·58	....	IV. soft.	Difficultly weldable
0·47	0·42	....	IV.	Very good.

We see from the above that the generally-accepted notion that the silicon is fully oxidized before the manganese and carbon are eliminated does not always hold good. In the use of pig-irons, high in silicon and manganese, a comparatively large amount of silicon remains obstinately in the metal, and it is not until the process is nearly completed that it is completely oxidized.* The following results exhibit this:

		Silicon. Per cent.	Manganese. Per cent.
a	1 Pig-iron	2.81	4.70
	2 after 5 minutes	1.85	4.50
	3 " 10 "	1.70	3.70
	4 " 15 "	1.23	1.86
	5 " 20 "	0.31	0.52—Hardness VI.
b	1 Pig-iron	2.09	....
	2 after 5 minutes	1.34	....
	3 " 10 "	1.27	....
	4 " 12 "	0.86	....
	5 " 15 "	0.49	....
	6 " 20 "	0.17	....—Hardness VI.
c	1 Pig-iron	1.59	...
	2 after 15 minutes	0.59	...
	3 " 17 "	0.41	....
	4 " 19 "	0.32	....
	5 " 21 "	0.12	....—Hardness VI. soft.

It is highly probable that the removal of the silicon from the metal is counterbalanced by the absorption of new material from the siliceous lining of the converter. Wedding has repeatedly drawn attention to this reaction, and has recommended the use of a basic lining to the converter, the best being a highly basic iron cinder. Such a lining would be especially applicable for hot irons rich in manganese—such as attack the quartz lining vigorously.

(TO BE CONTINUED.)

* From the *Zeitschrift des berg- und hüttenmännischen Vereins für Steiermark und Kärnten*, September, 1878.

* This finds a ready explanation in the recent investigations of Dr. F. C. G. Müller into the German Bessemer process, published in the *Zeitschrift des Vereines deutscher Ingenieure*, September and October, 1878. Dr. Müller finds that at a temperature of 1400° C., and above, the carbon takes precedence of the silicon in its affinity for oxygen, and it is not until the carbon is nearly or quite all oxidized that the silicon is able to appropriate the oxygen. In those cases where the initial temperature of the iron in the converter is less than 1400° C., the silicon combines with the oxygen, and raises the temperature to the point at which the carbon is capable of burning. T. M. D.

THOMSON AND HOUSTON'S SYSTEM OF ELECTRIC ILLUMINATION.

We have received the following communication from Professors Elihu Thomson and Edwin J. Houston in reference to their system of electric lighting:

"Some time ago, we published an account of one of the methods of using our lamp with vibrating electrodes, in our system of electric illumination. In this description, the current which gave the light also operated the vibrating device attached to the negative electrode. When a number of lamps are so used in one circuit, satisfactory results are not obtained unless each lamp is tuned to the same rate of vibration. We find that it is better to employ, to vibrate the electrodes, currents separate from those which produce the light. By the transmission of a single pulsating current through the electro-magnet coils of all the lamps in any circuit, synchronous vibration is readily imparted to the armatures or cores of the electro-magnet coils above mentioned, and through these to the electrodes.

"Our system is applicable to the use of direct or reverse currents. Where direct currents are employed, the arrangement above described is preferred. The existence of a cable of considerable length between any two lamps in one circuit is rather an advantage, provided the resistance of the cable is low, as the following reason will show. The extra current developed in the cable on the separation of the electrodes assists in preventing cessation of current due to excessive separation. The carbon electrodes used in our system vibrate through a comparatively small space, excessive vibrations being purposely damped. The steadiness of the light is thus secured.

"When reversed currents are employed, separate currents for vibrating the electrodes are not needed. The reversed currents, passing through a coil of wire surrounding a core of soft iron in each lamp, impart, when the coil is fixed and the core movable, a vibration to the core which bears the negative electrode. When, however, the core is fixed and the coil movable, the latter supports the negative electrode, and vibrates in the same manner.

"The reversed currents employed may be obtained directly from an alternating-current dynamo-electric machine, or the direct current from a dynamo-electric machine may be reversed by a commutator operated by the current, or other suitable means.

"When a number of small lights are to be operated by a single reversed current, this reversed current is caused to pass through the primary wire of a series of induction coils, the secondary currents of which feed the lamps.

"The use of induction coils in this manner allows the main circuit to remain unbroken, while the circuit of any of the lamps may be broken. The advantage of this in an extended subdivision of the light is evident.

"We have devised an electrical governor which, applied to a steam-engine driving a dynamo-electric machine, will maintain the current strength in its circuit. By this means, in the operation of a number of lights by a single current, the extinction of one or more of the lamps will not affect the others.

"We have also arranged the commutator of a dynamo-electric machine so as to obtain from it one or more reversed currents from the armature coils at the same time that the machine magnetizes itself and furnishes direct currents from the same armature coils."

MORRISON'S IMPROVEMENT IN FURNACES FOR STEAM-BOILERS.

The opinion entertained by many who are superficially informed upon the subject, that the limits of the capabilities of the *steam-engine* for substantial improvement have been reached, has been repeatedly shown by scientific engineers and mechanics to be fallacious; for in spite of the fact that thousands have devoted their talents to the improvement of our steam motors, it is susceptible of demonstration that the best constructed engine that it has been possible to devise up to the present time will only yield a useful effect equivalent to from 10 to 15 per cent of the duty which ought to be realized from the combustion of the fuel supplied to the steam generator.

The principal causes of this enormous percentage of loss, as engineers are universally agreed, are readily traceable to imperfections in the mechanical construction and setting of the steam generator, difficult of remedy under existing systems of practice, and in consequence of which combustion is carried on, at best, but very imperfectly.

The pouring out of the chimneys of our manufactories of enormous volumes of unconsumed carbon in the form of smoke, which, especially in crowded cities, has been often made the subject of legislative restriction, represents obviously one serious item of waste; and the escape of a notable percentage of partially consumed carbon in the furnace gases, in the form of carbonic oxide, represents another. We have still to add to these serious elements of loss the percentage of heat wasted by conduction and radiation to the walls of the generator and to surrounding objects, and the loss of heating effect incident upon the introduction of cold air into the furnace.

After summing up all these items, and deducting them from the theoretical duty that should be realized in a perfect machine, we have still to notice that, of the useful heating effect actually obtained from the steam generator, at least 20 per cent is lost somewhere during the passage of the steam through the engine.

The fact, however, that by far the greatest proportion of loss may be fathered directly upon the steam generator, would naturally indicate that, in seeking to improve upon existing practice, the *steam-boiler* should deserve our first attention; and the importance of improving upon the mechanism of the generator, with the view of obtaining more perfect combustion and greater steaming capacity per unit of fuel consumed, has long been recognized by inventors, and numerous plans, some of them more ingenious than economical, have been devised for the purpose.

The course of improvement in economical steam generation was at first directed simply to increasing the amount of heating surface in steam-boilers by return flues, then by submerged return flues, the tubular and tubulous systems, etc. The heat generated has been economized by carefully felting the boiler, and the hot gases in the stack have been employed to heat the feed-water. But the all-important question of effecting a more perfect combustion does not appear to have received the attention it deserves.

One of the most important requirements in promoting completeness of combustion is, that the intermixture of the gases evolved from the burning fuel with atmospheric oxygen shall be perfect and intimate; but, as furnaces are ordinarily constructed, such intimate mixture can not be attained, as the results of practice unfortunately demonstrate too well, by the simple admission of the air supply through the fire-bars, and where the nature of the fuel is such as to generate rapidly enormous volumes of combustible gases (such as bituminous coals or wood), this difficulty is intensified. Where the fuel is in a finely comminuted condition (coal-dirt or sawdust), the ordinary methods of combustion prove quite inadequate, and special means must be provided to consume it, and peculiar devices must be made use of to insure the passage of the air through the fire-bed, and to effect its proper and ultimate contact with the air.

It is obvious, from what has preceded, therefore, that improvements in effecting more perfect combustion are of supreme importance in the economy of steam generation; and, *cæteris paribus*, such artifices and devices to effect it will be the best which can be most easily applied to existing steam generators, without requiring radical and expensive alterations, and which can be operated at the minimum of cost for attendance and repairs.

The importance of improvements of this class being admitted on the score of economy in steam generation per unit of fuel consumed, the advantages of such an improvement, should it be practicable to adapt it to the combustion of coal-dust, sawdust, spent tan, peat, wood-shavings, and other forms of refuse combustibles, would, of course, be notably enhanced, by reason of the great saving that could be made in the first cost of fuel, as compared with that commonly employed.

With these preliminary remarks, we shall be prepared to consider in how far the system of furnace attachments, devised and patented by Mr. George Morrison, of Philadelphia, and which the writer has had the opportunity of studying in practical operation at the factory of the Messrs. Hale, Kilburn & Co., of that city, meets the demands of theory and the requirements of practice.

The system of Mr. Morrison will be understood from the following brief description:

On the top of the bridge-wall of the ordinary horizontal steam-boiler, or near the same, is placed a transverse pipe, provided with a number of perforations, preferably on the upper side only, and with this pipe communicates a horizontal pipe, contained in the flue at the rear of the bridge, the two pipes in question forming a T-shaped combination. A second pipe, U-shaped, traverses the flues at the rear of the bridge, its outer end being open to the atmosphere, and the other projecting into the leg of the T-pipe before mentioned. Within this leg, likewise, is placed a nozzle, directed toward the perforated cross-piece of the T, and to which superheated steam may be conveyed by a suitable pipe. By suitable connections, this steam-pipe may be divided and made to deliver, by the device of a steam-blower, an artificial blast of steam and air under the grate-bars. Commonly, however, the inventor prefers to employ a fan. There are, it will be observed, no increase of grate surface, no perforations of the walls, and no radical or expensive changes of the boiler settings required. The operation of the device is obvious. The volumes of partially burned gases generated in the fire-place (carbonic oxide, hydrogen, hydrocarbon, and other combustible gases) which, under ordinary circumstances, would suffer but most imperfect combustion on their passage through the remaining fire-space of the boiler, and would be hence practically wasted, are in this case met at the bridge-wall by the fierce jet of superheated steam and air, delivered through the numerous perforations of the T-pipe, bringing the air in the condition to produce the most intense combustion into that intimate and perfect contact with the unconsumed furnace products, which, as we have before affirmed, is the essential element of a perfect combustion.

The effectiveness of this simple contrivance is further demonstrated by the fact that the combustion of refuse fuels, such as coal-dirt, sawdust, spent tan, etc., can be carried on in ordinary furnaces supplied with the attachment, not only with a complete suppression of the smoke nuisance, but with a degree of economy as to steaming capacity per pound of fuel surpassing that obtainable with the much more expensive fuels commonly employed for steaming purposes.

The opportunity afforded to the writer to study the operation of the invention at the furniture manufactory of the Messrs. Hale, Kilburn & Co., of Philadelphia, where it has been in continuous use beneath two of the three boilers of that establishment for about a year, proved to be a source of as much surprise as gratification. Coal-dirt and the shavings and other refuse of the furniture-makers is the fuel used; the smoke nuisance, which had previously been a source of trouble and litigation with the concern, has been completely suppressed; the steaming capacity of the boilers has been materially increased, as is manifested by a saving of 25 per cent in fuel consumption and with no more cost for attendance and maintenance than is ordinarily required.

From the facts which the writer has gleaned in relation to the practical working of this improvement in boiler-setting, he is fully convinced of its great practical value, and takes pleasure in stating his conviction that it illustrates very happily a sound appreciation on the part of the inventor of the difficulties of the problem to be solved, and a long stride in the right direction for their practical solution.

COST OF STREET-LIGHTING BY ELECTRICITY IN PARIS.

At a recent meeting of the Society of Arts, Mr. James N. Shoolbred read a paper "On the Practical Application of Electricity to Lighting Purposes," giving the particulars of cost of plant and of operating electric lights under a variety of circumstances, and by several different systems.

Of the various streets and other places in Paris, lit up by the Jablochkoff system, the Avenue de l'Opera is the one which, from its central position, has attracted most attention, and therefore will be taken here as a type example.

The Avenue de l'Opera, including the Place de l'Opera at one end, and the Place du Theatre Français, are lit up by 62 lights; 46 single-candle and eight double-candle (on the Place de l'Opera). Originally, only about 40 were provided, but the illumination being insufficient, the number was augmented (at the contractor's expense) to the amount just stated.

These are divided into four groups: one on the Place de l'Opera, two in the Avenue de l'Opera, and one on the Place du Theatre Français. Each group of lights is supplied with electricity from a (double) Gramme "16-light" machine, driven by an engine of 20 nominal horse-power.

A very considerable amount of mystery has been kept up by the patentees of this system as to the cost of it. The expense they state it to be is (1·06 francs) 11d., nearly, per light per hour, which they hope, so it is said, shortly to reduce by one half. However, the payment to the patentees by the city of Paris is at a rate of 1·25 francs per hour on each of the original lights stipulated in the contract, the augmentation to 62 being entirely gratuitous by the contractor, and in order to keep up an effective illumination. The total remuneration is 37·2 francs (29s. 9d.) per hour. The original gas illumination consisted of 344 jets, and costs 7·224 francs (6s.) per hour. The electric illumination is considered, however, as equal to 682 gas-jets, say, to double the original illumination; that is, to a cost of 14·45 francs per hour, as against 37·2 francs for the electric one. The latter, therefore, cost 2·6 times that of the gas of equal illuminating intensity.

Need it be added that the city of Paris has terminated the contract with the last day of November?

The contractors have, however, offered to continue the contract at the reduced rate of 0·60 francs (6d.) per light per hour. The Municipal Council of Paris have declined to continue any contract, except provisionally, up to January 15th, 1879, and that only at the rate of the original cost of the gas, namely, at a total expense of 7·224 francs (6s. nearly) per hour. By information lately received from Mons. Allard, the chief-engineer of the lighting department of the city of Paris (under the engineer-in-chief, Mons. Alphand), and by whom the above details have been kindly communicated, the contractors for the lighting, the Société Générale d'Electricité, have consented to undertake the lighting at the above reduced rate. The price paid to them, therefore, will be, up to January 15th next, at the highly remunerative rate of about 1¼d. per light per hour.

A series of very careful photometric measurements carried out by the municipal authorities in the Avenue de l'Opera itself with the existing illumination, showed each light to possess a maximum of 300 candles of intensity with the naked light; while by the interposition of the opaque globe, the maximum was reduced to 180 candles (a loss of 40 per cent), and this again to a minimum of 90 candles during the darker periods through which this light passed.

Many other applications of the Jablochkoff candles with the Gramme machine occur in Paris, such as at the Magazins and the Hotel du Louvre, at the Theatre du Châtelet, at the Hippodrome, at the Hotel Continental, etc. Still, as in none of these cases have the financial results been ascertained on such good authority as in the case of the Avenue de l'Opera, it has been thought advisable to pass them over. The main object, held constantly in view in the present communication, has been to ascertain the carefully-prepared financial results of a few applications, which have been supplied on unimpeachable authority, rather than to attempt to present those of a larger number, in some of which the results might have been open to doubt.—*Jour. Franklin Inst.*

PROGRESS IN SCIENCE AND THE ARTS.

General Science.

The much-mooted question of a relation of cause and effect between the periodical occurrence of commercial crises and the condition of the solar surface has just found another distinguished champion in Prof. W. Stanley Jevons, who, in a recent communication to *Nature*, makes the following statements: "I can entertain no doubt whatever that the principal commercial crises do fall into a series having the average period of 10·466 years. Moreover, the almost perfect coincidence of this period with Brown's estimate of the sun-spot period (10·45 years) is of itself strong evidence that the phenomena are connected."

The conclusion that the coincidence above noted establishes a logical connection of cause and effect between phenomena occurring at a distance of vast intervals of space, and so diverse in character, would appear to be purely fanciful, were it not demonstrable, upon the most complete and satisfactory experimental evidence, that every manifestation of terrestrial activity has more or less directly a solar origin. The only notable exception to this statement is the phenomenon of the tides. All other forms of energy, physical or chemical, organic or inorganic; the multifarious consequences connected with the circulation of air and water, involving the causation of winds, aërial and aqueous currents, rain-fall, and their effects in establishing those climatic conditions upon which organic growth and, inferentially, the very existence of mankind and the successful pursuit of agriculture and commerce, is absolutely dependent, are directly referable to the forces of solar radiation. This much being proven, it is not overstepping logical boundaries to inquire whether, if the solar energy is variable in intensity, that variation will not manifest itself in a variety of ways in modifying the activity of terrestrial phenomena. That the intensity of solar radiation is variable, has been demonstrated by the most indubitable experimental evidence, and that terrestrial phenomena, the origin of which may be directly traced to the sun, will manifest a variation, corresponding in intensity and activity to that of the solar energy to which they may be ultimately traced, is a logical conclusion that can not be evaded. When, however, the attempt is made to enter into particulars, or to apply the above conclusion to particular cases, in order to determine how and to what extent in such particular cases the terrestrial order of things has been controlled and modified, we are confronted with grave difficulties; for the interaction and interdependence of the many terrestrial forces involved in the production of any effect of magnitude complicate the problem of its correct analysis immensely.

From this most interesting and, until comparatively recently, unsuspected relationship of solar activity and terrestrial response, has grown a variety of speculations, of which that referred to at the opening of this topic is an example, in which such apparently utterly disconnected and arbitrary matters as the social, commercial, and political affairs of mankind are attempted to be brought under the dominion of the solar ray. That such connection is highly probable, will appear from the foregoing train of reasoning, and is strengthened most materially by the occurrence of many such remarkable coincidences as the one which Prof. Jevons lays such stress upon. But until fact has been piled upon fact, like Ossa upon Pelion, conclusions of such far-reaching consequences, however tempting to the generalizing mind, must still be held to be simply probable, but not proven.

The "fourth condition of matter," a supposititious condition beyond the gaseous, and physically as far above it as is the gaseous condition above the liquid, which has lately been claimed to exist by Dr. William Crookes, and to which we briefly alluded in our summary of last week, has found a supporter in our contemporary, *Engineering*, in whose columns we meet with substantially the following comments thereon: Mr. Crookes's recent researches have lifted this remarkable conjecture from the region of speculation to that of fact, and have demonstrated that a fourth condition of matter still more ethereal than the lightest gases actually exists; or, what is much the same thing, that gases, under the influence of high exhaustions, become so far changed in their physical constitution and properties as to open up a field of physical phenomena entirely foreign to the gaseous state. We have said enough, our contemporary concludes, to show that a new world has been opened to physical science, in which great discoveries may be added to the science of the future.

Geology and Geography.

From the Annual Report of the Secretary of the Interior we learn that the Tenth Annual Report of the U. S. Geological and Geographical Survey of the Territories, under the direction of Prof. Hayden, will soon be ready for distribution. This volume will contain an account of the work of the survey during the year 1876, and will refer especially to observations made in Southern Colorado and New Mexico. It will contain 846 pages, octavo, and 80 plates, sections, maps, etc., of which about 50 will illustrate the remarkable cliff dwellings of that region and their inhabitants. This report, it is predicted, will prove to be the most generally interesting of the whole series. The delay in its publication has been caused, it is said, on account of the preparation of the plates. Of the Eleventh Annual Report, comprising the history of the field-work of the survey for 1877, in the region of Southern Wyoming and Idaho, about 250 pages were in type at the beginning of the year.

Great interest and no little anxiety are manifested in behalf of the Swedish Exploring Expedition, which, under the command of Prof. Nordenskiöld, sailed from Hammerfest last July, with the intention of demonstrating the existence of an available northern passage from the Atlantic to the Pacific. This expedition is the natural sequence of Nordenskiöld's successful accomplishment, in the years 1876 and 1877, of the feat of reaching the mouths of the great Siberian rivers, the Obi and the Yenisei, by way of the Sea of Kara, by which he succeeded in opening a new commercial water-way, making the vast regions of Siberia accessible for profitable commerce with Europe for several months of the year. The object of the present expedition is to extend the limits of the former explorations, by making the complete circuit of the Northern Sea, and if possible to reach Japan by way of Behring Straits. By this time, it is believed, if no unforeseen accident has happened to the expedition, the successful passage of the Straits should have been accomplished. Should the feasibility of traversing these northern waters, with comparative freedom from mishaps, even for a few months only of each year, be successfully demonstrated, the advantage accruing therefrom, in a commercial sense, will be highly important. The expedition of Nordenskiöld consisted of the steamers Lena and Vega, and on the 20th of August last had passed the northernmost point of Asia, reaching the mouth of the Lena about a week later. Here the two vessels parted company, the Lena to ascend the river to Yakootsk, and the Vega to continue the further exploration of the Siberian coast, and if possible to reach Japan. As the greater portion of the Siberian coast from the mouth of the Lena to the Straits has been already explored by sailing vessels, the practicability of the remaining portion of the voyage is generally admitted. It is fully time, however, that the Vega should be heard from, and great anxiety is felt in Sweden to hear some news of the intrepid explorer.

Mining and Metallurgy.

A confirmation of the favorable opinion we have always maintained in the JOURNAL, concerning the natural wealth of our far-off territory of Alaska, is afforded us by the statements credited to William G. Morris, Special Commissioner of the Government, appointed to make an examination of the territory, and who has just returned to San Francisco. He reports Alaska to be beyond doubt rich in gold, silver, platinum, iron, copper, coal, and other minerals, and anticipates that the mineral wealth of the territory will originate one of the greatest mining excitements of the time at no very distant period. Of the interior of the country but little is known, because of the unfavorable disposition of the native inhabitants; and nearly all the prospecting that has been done, and which has warranted such favorable reports of the mineral wealth of the country, has been practically confined to the neighborhood of the coast, and to the coast islands.

One vein, discovered in the Tengas Narrows, near the port of Wrangel, is reported to have assayed $300 per ton in gold, and $27.37 in silver. All along the coast, Mr. Morris reports, out-croppings of metal-bearing quartz may be observed; and under a government which would afford reasonable protection to life and property, he believes this hitherto unknown country would speedily enter upon a career of unexampled prosperity, and mineral treasures would be unearthed which would astonish the world. The region of southeastern Alaska, bordering upon British Columbia, and which he describes as being abundantly traversed by small water-courses, he believes, will yield placer diggings as rich as any that were found in California in the palmiest days of surface mining. But nothing will be done toward the development of these riches and the population of the territory until the government has enacted and put into practical effect laws for the protection of life and property—of which there are at the present time none in existence. Referring to this topic specially, he says: "There is no law whereby any one can obtain title to mining and other property. The preëmption laws of the United States are not extended over the territory; in fact, every thing is in a state of chaos and confusion."

Mr. Morris pronounces in terms equally favorable upon the value of the timber resources and the fisheries of our far-off territory.

Dr. Wedding, in his excellent elaboration of Percy's Metallurgy, sums up his views of the causes contributing to the beneficial effects of the hot blast in blast-furnace working briefly as follows: 1. The increase of the temperature of the blast is accompanied by a corresponding increase in the amount of carbonic acid, and a corresponding decrease in the amount of carbonic oxide generated in the first combustion. 2. The high temperature thus attained is made still more intense by the previous excessive heating of the coal. 3. This heightened intensity of temperature effects a corresponding saving in fuel, which is much greater than the quantity expended in heating the blast. 4. The relative production, that is, the amount of materials smelted, compared with the amount of fuel used for the purpose, is increased: and 5. The absolute production, that is, the amount of materials smelted in a given time, is increased, since combustion is accelerated, and the working of the furnace becomes consequently more rapid.

As confirmatory of the conclusions reached by Prof. T. M. Drown, concerning the effects of alkaline carbonates in removing the impurities from iron, and an account of whose experiments appeared in a late issue of the JOURNAL, we may record the experimental trials of Vanderkeyn, to prove the utility of employing molten soda in the puddling process. This investigator is of the opinion that the chief benefit to be derived from the use of this "medicine" is the elimination of silicon, especially from coke irons. He recommends that the soda be introduced about three or four minutes before the iron comes to nature, and cautions that the damper be closed for the time, lest the pulverulent material be carried off with the draught.

Vanderkeyn announces, also, that the effect of the soda in reducing the percentage of phosphorus and sulphur is very noticeable, and believes that by the use of alkalies it will be possible to produce high-grade irons from ordinary pig. He considers, likewise, that the use of the alkalies in caustic form will be attended with better results than when the carbonates are used, the chemical activity of the former being more energetic.

In California, Nevada, and Montana, where native sulphur occurs in masses and mixed with the rock as a gangue accompanying metallic ores, the production of sulphur is in certain places a profitable industry. The following mode of purifying the native material, which is somewhat novel, and which is said to be universally practiced on the Pacific Coast, is worthy of description.

The "purifier," in shape not unlike a percolator, is of boiler-iron, and is about four feet in diameter, eight feet high, and has a capacity of about a ton of charge. The bottom is perforated and funnel-shaped, and a stout wrought-iron lid is provided for the top, with bolts or other means of attachment. A double piece of heavy gunny-cloth having been spread over the perforated bottom, the charge of previously dried crude sulphur is dumped into the receiver, the lid is securely fastened, and superheated steam is admitted through an inlet pipe provided in the side of the same. The sulphur, gradually melting, sinks to the bottom, where it is from time to time drawn off and cast into molds or boxes. At Lakeport, California, where a mixture containing both sulphur and

cinnabar in paying quantities occurs, the ore is placed in the usual cinnabar reduction furnace, and both mercury and sulphur vapors are passed together and condensed in the first receiver. Into this, superheated steam is passed by which the sulphur is liquefied, and the mercury volatile zinc is condensed in a second receiver.

In a second paper on "The Chemical and Physical Properties of Steel Rails," published in the January issue of the *Journal of the Franklin Institute*, Dr. Dudley, Chemist to the Pennsylvania Railroad Company, discusses the important question as to whether the wearing power of such rails increases with the hardness of the steel. His investigation appears to have been very thorough, and his conclusions are fortified with the results of a large number of analyses. He finds, contrary to the opinion generally entertained, that the softer rails, containing low carbon and low phosphorus have yielded better results as regards wearing powers than the harder rails.

The trials of the Dupuy direct process, which have from time to time been reported in the JOURNAL, during the past year, appear to have attracted the attention of English metallurgists; and the statement is authorized that the inventor of the process named has sailed for Europe in consequence of an invitation extended to him by English iron manufacturers, to test the practicability of his process abroad.

It is announced that the establishment of concentrating and reducing works at Portland, Me., has been decided upon by the Sullivan Silver Mining Company. The mill is expected to be in readiness for starting early in the spring, and will depend for its supplies upon eight silver mining companies, five in Maine and three in New Hampshire, which it is affirmed have agreed to send their ores as soon as the works are in running order.

The Clifton Copper Mine, located on the eastern frontier of Arizona, at the town of Clinton, near the New Mexican line, and some 500 miles east from Yuma, is represented as being one of the richest copper mines of the far West. The ores are easily worked, and so rich that it is found profitable to transport them by team a distance of several hundred miles, to Trinidad, Colo., where they are shipped by rail to Baltimore for reduction.

The Estill County (Ky.) lithographic stone has lately been pronounced, by a New York expert, after a thorough examination, to be "first-class and suitable for all kinds of work." The importance of this decision, if it be well founded, will appear from the fact that the annual consumption of this product in the United States exceeds the value of $10,000,000.

Chemistry and Technology.

The following chemical memoranda will be found of interest: A delicate test for the detection of *glycerine* (and conversely for boracic acid and borates) is the intense greenish coloration imparted to a colorless flame by a borate when moistened with glycerine. Care must be taken, however, to notice first that the borate employed does not itself impart this color to the flame, which, under certain circumstances, as, for instance, in presence of sulphuric acid, it will do. One per cent of glycerine in milk, and one tenth of one per cent in beer, may, it is affirmed, be detected in this way.—Jaquemart suggests, as a reagent for detecting the presence of *alcohol* without distillation, the employment of a solution of mercuric nitrate; a portion of the salt is reduced to mercurous salt, and, upon addition of ammonia, a black precipitate is formed, which is heavier and more intense the more alcohol there may be present. Methylic alcohol does not give this precipitate. If the liquid to be tested is colored, the same should first be decolorized with bone-black. Ethereal oils and insoluble matters are removed by hydrochloric acid, and solids, such as salves and soaps, are kneaded in water before testing.—To detect *nickel* in the smallest traces, a recently-recommended reagent is the zanthogenate of potassium, which gives with aqueous solutions of the metal, when in small quantity, an intense yellow coloration; and when nickel is present in quantity, a yellow precipitate, insoluble in excess of ammonia. Copper gives the same coloration and precipitate, but this disappears at once on addition of a few drops of ammonia.

The substance of which the much-talked-of Swiss "self-luminous clock dials" are composed has been examined by Prof. Henry Morton, of the Stevens Institute, and has been ascertained to be the "sulphide of calcium," which is caused to adhere to the dial surface by means of some resinous varnish. This compound has long been known to possess phosphorescent qualities of a high order; but as prepared for this special use, its phosphorescence has never before been equaled, as may be judged from the fact that, after being shut up in a box for five days, it was still visible in total darkness. Prof. Morton advances the opinion that further advances in this direction may develop discoveries of most surprising character.

Mathey, a Neufchâtel chemist, communicates to one of our French exchanges the following facts relating to the same subject. The phosphorescent dials, he states, are usually made of paper or thin card-board, enameled and covered with an adhesive varnish, upon which is dusted, with a fine sieve, powdered sulphide of barium. The sulphides of strontium and calcium possess the same property; but our authority affirms they lose their phosphorescence more quickly than the barium salt. When the dial has lost its self-luminous qualities, they may be restored by an hour's exposure to sunlight, or by burning near it a few inches of magnesium wire.

A new material, called "muralis," and designed, as its name will suggest, as a wall covering, has lately been brought out in London. It is described as being made of a mixture of linseed-oil and fiber. (The question here naturally arises, what kind of fiber?) It is said to be excellently adapted to receive ornamentation in relief by stamping, and from its extremely tenacious and elastic nature to be well suited to resist rough usage. From the description given of it, it would appear to be not very unlike the product known as "linoleum," which has lately grown largely in favor as a floor covering in place of oil-cloth, and which is made of a mixture of oxidized linseed-oil and cork-dust. The tough, elastic, and wearing qualities of this material are so well known that the claims made in behalf of "muralis" appear to be not unreasonable.

Slag-wool—produced, as our readers are generally aware, by blowing blast-furnace slag as it runs from the furnace into the finest filaments, by means of a steam-jet—is now woven into strips or bands, in which form its application to steam-pipes and boilers, as a non-conducting covering, is made very convenient.

The New York *Paint and Drug Reporter* is authority for the statement that the *saponification of petroleum*, which has hitherto been supposed to be impracticable, has been successfully accomplished. How or by what process deponent sayeth not; but the products, which are said to be perfect specimens of saponification, are claimed by the inventor to be especially applicable, in the operations of scouring and finishing in textile manufactures, to general domestic uses, and, by reason of their antiseptic properties, to medicinal uses.

It has lately been pointed out that nearly all the *tin plate* used in the fashioning of domestic utensils contains lead, and some of it in considerable quantity. Dr. Querner, of Philadelphia, reports to a contemporary that he has examined a large number of tinned vessels from various sources (employing the nitric acid and iodide of potassium reaction) and has found lead in every case.

A process for producing a substitute for *fire-gilded glass*, which is affirmed to yield results fully equal to the best specimens of ancient art, consists in introducing gold-leaf or platinum into the body of the glass and amalgamating the precious metal with the latter by means of the blow-pipe. The designs thus produced are protected from wear by a film of glass, and are declared to be practically indestructible.

Mechanics and Engineering.

The *Wooten anthracite-dust-burning furnace*, which has hitherto been applied only to freight locomotives, is about to be put to trial on passenger trains. We make this statement on the authority of the Reading *Eagle*, from whose columns we glean that a passenger engine with the Wooten appliances for dust-burning has just been turned out at the depot machine-shops of the Philadelphia & Reading RR. at Reading.

Of the mileage of new railroads constructed in the United States during 1878, New England is credited with 41 miles; the Middle States, 333 miles; the South Atlantic States, 111 miles; the Gulf States, 167 miles; the South interior, comprising Indian Territory, Arkansas, Tennessee, Kentucky, and West Virginia, 53 miles; the North interior, comprising Ohio, Michigan, and Indiana, 273 miles; the Northwest, comprising Illinois, Wisconsin, Minnesota, Iowa, Missouri, Kansas, Nebraska, and Dakota, 1235 miles; the Far West interior, comprising the district included between Texas and the Northwest and Pacific States, 327 miles; and the Pacific States, 122 miles.

Of the new milcage nearly one half is to be credited to the States classed above as Northwest, the State of Minnesota heading the list with 338¼ miles, or nearly one eighth of the total new railway reported. Of the older States, Pennsylvania made the best record, showing a new mileage of 188½ miles.

From late accounts of the Channel tunnel scheme, which of late has been almost forgotten, we glean the statement that the projected tunnel mouth on the English side at St. Margaret's Bay has been abandoned, because of certain unfavorable features, which recent surveys have brought to light, and which would entail large and unnecessary expenses in preliminary work. The scheme now proposed provides for the sinking of a new shaft at or near Dover. The site on the French side of the Channel at Sangatte (near Boulogne) is still believed to be the best that could be selected. There the exploring shaft has already reached a depth of 70 meters (by 2 meters wide), and but 10 meters more of sinking will be required to begin the horizontal cutting, from which the practicability of the undertaking will shortly be decided. Though the project at present attracts little or no attention, it would appear from the foregoing that it has by no means been given up by its projectors.

From statements lately made by M. Pelletier, a French engineer temporarily sojourning in New York, it would appear that the project of forming an inland sea in the interior of Tunis and along the eastern borders of Algeria, is not so purely chimerical as has been generally supposed. The general scope of the project will doubtless be quite familiar to our readers from having been frequently alluded to in the JOURNAL; in its present form, however, it appears to have received a decided impetus by reason of the championship and personal coöperation of De Lesseps. The progress which the scheme has made may be briefly summed up as follows: A report made some years ago by Capt. Rondaire (Roudaire?) calling attention to the fact that large areas (the Schottes) in the interior of the countries named were depressed below the level of the Mediterranean Sea, and suggesting the feasibility of converting these areas into an inland sea by means of a canal of inconsiderable length, from the establishment of which communication, a vast improvement in the climate of the countries involved and important commercial results might be reasonably expected to ensue, attracted the attention of the Academy of Sciences, and especially of De Lesseps, through whose joint instrumentality the favorable consideration of the Chamber of Deputies was lately obtained. Ample funds were voted to defray the expenses of a thorough examination and survey of the region, which was lately accomplished by a body of engineers under the immediate direction of Lesseps and Rondaire. The result of this expedition is affirmed to have been to gain the complete adhesion of De Lesseps to the practicability of the project of bringing the Schottes into communication with the sea by a canal of 20 kilometers length, at a cost of 60,000,000 francs, the construction and maintenance of which, it is confidently expected, will bring about climatic and commercial results not inferior in magnitude and utility to those accomplished by the Suez Canal.

The "duplexing" of several of the Atlantic cables, the successful accomplishment of which during the past year was noticed in our last, is now affirmed to have effected an increase in working capacity of 70 per cent.

Apropos of the kindness with which the Japanese take to western civilization, we may report that there are in operation in that empire no less than 125 telegraph stations, employing 5000 miles of wire. At the close of 1876, a line of railroad 48 miles in length, connecting the important towns of Kioto and Hiogo, was in complete working order, and its extension to Otsu has already been undertaken. The bridges of this road are of iron and stone, both the road-bed and rolling stock are described as being of the most approved construction, and its passenger and freight traffic as being constantly on the increase. No less than 1000 miles of

new telegraph are now in course of construction, and still further extensions are said to be contemplated.

In spite of their antipathy to the introduction of western ideas, the Chinese appear also to appreciate the telegraph. Several lines have been in successful operation in the empire for a year or two, and now, it is reported, several new and extensive lines are about to be constructed—one from Tien-tsin to Taku, and another connecting Tien-tsin and Peking.

UTAH MINES.

Special Correspondence of the Engineering and Mining Journal.

STAR DISTRICT.

Star District was discovered and located in the spring of 1870. It lies ten miles southeast of 'Frisco and five miles west of the Beaver River. The mines are situated in a low cluster of mountains, called the Star Range, that are surrounded by desert valleys covered with sage brush and greasewood. In November, 1871, the district was divided into two, one called the North Star and one the South Star. Water is found in the foot-hills of North Star District. A great deal of work has been done in this district, and some of the mines have produced largely. The principal ledges of North Star are the Rebel, Golden Era, Hidden Treasure, Shenandoah, Midas, the Minnesota, and the Cortez.

There are tunnels and drifts on the Rebel aggregating five hundred feet. The ore averages 55 oz. silver and 65 per cent galena; 1500 tons have been extracted from this mine. Work is now being prosecuted. Golden Era carries carbonate of lead ore, which assays from 30 to 100 oz. silver, and 60 per cent lead. It is developed by a 50-foot shaft and 150 feet of drifts; 300 tons of ore have been taken out. The Cortez ledge carries gold, silver, lead, and iron. About 400 feet of shafts and drifts have been run; work is now abandoned. The product was about 150 tons. The ore yields 50 per cent lead, 60 oz. silver, $30 gold per ton. A seam of iron runs through the ledge about 15 inches wide, which carries the gold.

The Lake Superior lode carries from 15 to 40 per cent copper and from 20 to 60 oz. of silver and $30 gold. This is a contact vein. The hanging wall is granite—the foot wall quartzite. The width of the ledge is 30 feet, but most of the ledge matter is waste. Two shafts have been sunk on the mine, one 67 feet deep and one 40 feet deep. Both of them run through a stratum of good ore. Four hundred tons of ore have been extracted of different grades, averaging about $50 per ton. The formation of the district is slate, quartzite, limestone, and granite.

South Star District joins North Star on the south. The principal locations are the Hoosier Boy, Elephant, Wascoe, St. Mary's, Reindeer, and the Mammoth. The Hoosier Boy, held under United States patent, is owned by a New York company, which also controls the Shauntic smelters. The ore is of a free character, not requiring calcining. It carries iron enough for fluxing. Average value of the ore, 30 oz. silver and 50 per cent lead.

The Wascoe is developed by a shaft 350 ft. deep and drifts aggregating about 250 feet. The ore is gray carbonate, averaging 60 oz. in silver and 45 per cent lead. Daily shipments are now being made from the mine to 'Frisco, where they are reduced in the smelting works. The general formation is limestone.

The Elephant lode is about the same grade of ore as the Wascoe. This mine sold three years ago to an Ohio company for the sum of twenty-five thousand dollars. The company suspended work about three months ago.

The reason of the failure is, that the property has been badly managed, the foreman and superintendent pocketing the major part of the proceeds from the sale of the ores.

The ores of the Elephant ledge carry 60 oz. of silver, 60 per cent lead, and iron sufficient to flux the ores. The ores from this mine are worth more than their assay value as a flux for others. There have been over 500 feet of shafts, drifts, and stopes run on this property. The formation is limestone, very much broken up. The ore has all been found in chambers. The Mammoth lode has been developed by a shaft 150 feet deep, and drifts aggregating 250 feet. The ore is of the same character as the Elephant, no work being done on the mine.

The St. Mary's lode is now worked by a small force of men. The ledge is a very promising one; daily shipments of ore are being made from this mine. The Boston, held under U. S. patent, is owned by Mr. Searles, of Chicago. But little ore has been taken from this mine. The company has been for the last year driving a tunnel for the purpose of tapping the vein at a depth of 500 feet. The formation is limestone. The character of the ore is the same as former mines.

The next district organized was the Rocky District. It joins North Star on the northeast. There is a good deal of work being done in the district. The formation is limestone. The ores carry silver, copper, lead, and iron. Small shipments are being daily made to 'Frisco.

The next district is Beaver Lake, lying three miles north of Rocky District, being divided by a small, barren valley. Formation, granite and limestone. Some very rich ores have been taken out of the mines in this district; but few men are working here now. The ores are gold, silver, copper, iron, and lead.

Lincoln District is situated on the east side of the Beaver Valley, not over twenty miles southwest from Beaver City. There are several locations in the district. The ores carry lead and silver. The principal mine in the district is called the Old Lead mine. It was worked twenty years ago. It is where the Mormons received their supply of lead to oppose the progress of Johnston's army into Utah in 1857. The district is a valuable one, but it is awaiting cheaper modes of transportation before it can be worked at a profit.

Granite District joins Lincoln District on the northeast. In this district is a famous bismuth mine, assaying as high as 60 per cent bismuth.

On the north side of Lincoln District is located the Bradshaw District. The principal mine is the Cave Lode. It carries gold and iron. It is owned by W. S. Godbe, and the ore is used in his furnaces in 'Frisco as a valuable flux. The ore averages $100 per ton, in gold, and about 50 per cent iron. Ten tons daily are shipped to 'Frisco, thirty miles to the southwest. The route of the Utah Southern Railroad, which is to be completed to Frisco on the 1st of next July, runs through this valley, and it will open up the richest and most extensive mining region in Utah Territory.

ARCHIBALD.

THE BODIE (CAL.) MINES.

Correspondence of the Engineering and Mining Journal.

As there have been so many inquiries from the East as to the cause of the gradual decline in the Bodie stocks, while the reports from the various mines continued so favorable, it may be as well at once to say that this decline is distinctly attributable to the claims made to the ownership of the mines by purchasers under the Act of Congress of 1853. The fact that these claims existed had been known to not a few long before the facts were published; and as the settlement of such claims, either by litigation or in an amicable manner, must inevitably absorb a certain amount of the capital of the mines, it was but natural that, in anticipation of the publication, there should be a good deal of "short" selling. Now that the matter has been made public, and that the various companies are settling amicably with the State claimants, the decline has been arrested, and in view of the news from the mines themselves, a gradual enhancement in the quotations—which is better than a too rapid recovery—may be looked for.

As for the Bodie itself, the ore in the bottom is said to be not quite so good. The drifts north and south of the Bruce winze are both improving, and the ore is of very fine quality. It is stated that the new developments in the Standard mine are all in the direction of the Bodie mine. The bullion shipments of the Bodie during December amounted to $91,070.29. In the Standard, the stopes are all looking well; work is going on on both the east and west cross-cuts, and there is enough ore in sight to leave no reasonable doubt that dividends will continue regularly to be paid. The bullion shipments from the Standard during December amounted to $103,913.11. The total for December from these two adjacent mines is $194,983.40, an increase of about $14,000 on the bullion shipments of November. It will be recollected that the Bodie ore averages between $300 and $400 per ton.

The Bulwer mine is continuing the shipment of ore—620 tons—to the Bodie mill. The Ralston ledge in the south drift is 18 inches wide, of very good ore. The Stonewall stopes continue to look well.

In the South Bodie mine, the shaft has reached a depth of nearly 400 feet, all timbered and in good working order. The formation is a coarse porphyry, with occasional veins of clay and quartz. The foot-wall shows a continuance of the ledge of porphyry found on Bodie Hill.

The water in the Dudley mine is greatly on the decrease; the shaft is down 340 feet. This mine promises very fine developments at an early date.

In the Summit mine, good headway is being made in cutting out and timbering the shaft. The shaft-house is completed, and the machinery works well.

The Mono shaft is down 420 feet, but there is too much water at the bottom of the mine to enable much work to be done. The east cross-cut on the 260 level is in 156 feet. The ground in the face is looking very favorable. A vein of one foot in width of low-grade ore has been cut, and it is expected the main vein will soon be reached.

In the Maryland Consolidated, three feet of pay clay and decomposed quartz were encountered last week in the west shaft, of the same appearance and class as found in the Bodie and Standard mines. Since then an eighteen to twenty-inch vein of rich quartz has been found. The ledge continues daily to improve, showing a large vein of fine ore and clay, which assures this company, independent of their other ledges, an abundant quantity of paying ore.

Work will shortly be recommenced on the Golden Gate, assays of the ledge, about 18 inches thick, running as high as $70 per ton, and appearances favoring a large and rich vein. The ledge is in a direct line with the Dudley and Black Hawk ledges, and between them, north and south, carrying apparently the same rich ore-bearing channels. The Golden Gate promises to prove one of the finest Bodie mines.

In the Black Hawk, the total depth reached is 209 feet. The ledge in the bottom of the shaft is about 3 feet wide, and prospects well in gold. The Syndicate mill is running steadily, and the south drift is constantly advancing. The winze on the Osceola ledge has been sunk to a total depth of 95 feet. The ledge is 4 feet wide, of good ore.

In the Addenda mine, the depth reached is 160 feet, and sinking is being continued in a formation of clay and quartz.

The west cross-cut from the 300-foot level of the May Belle is making good progress. The country rock is in brown iron-stained porphyry, with occasional seams of clay and quartz. It is believed that this cross-cut will intersect the large ledge which is considered the principal vein of the Dudley mine on the north.

In general, it may be stated that appearances favor magnificent developments in Bodie during the coming spring.

C. H. H.

ELECTRIC ILLUMINATION NOTES.

POSSIBILITY OF ILLUMINATING THE NEW YORK POST-OFFICE WITH ELECTRICITY.—We note the statement that the Postmaster of this city has been authorized to experiment with the electric light for the illumination of the main floor.

A French inventor proposes to produce electric carriage-lamps, so that ordinary carriages drawn by horses will be illuminated by electricity supplied by the rotary motion of their wheels; locomotives, while in motion, will light up the trains they draw; and steamships supply themselves with powerful lights.

A FLEXIBLE CARBON.—The *Ironmonger* of January 4th, 1879, says: "The Sun Electric Light Company has acquired a patent for the manufacture of flexible carbon—a very important advantage, as it can be rolled up and stowed away in a small compass—and it is about to use it in its patent lamp at the Crystal Palace. If the experiment answers, it is anticipated that the entire Palace will be lit up in the same manner."

The Lighting Committee of the Paris Municipality has reported in favor of a twelve-months' experiment. The Avenue de l'Opéra, the Place de la Bastille, and one of the market buildings are to be lighted by electricity at a charge not exceeding six cents per hour for each burner, and the gas company is to light the Rue du Quatre Septembre and the Place du Château d'Eau in an improved fashion at an extra charge of not more than one cent per cubic meter.

NOTES.

MINERAL WAX.—A most remarkable discovery has been recently made in the Sierra Madre Mountains, about fifty miles northeast of Los Angeles. It appears to be a snow-white, resinous substance, softer and lighter than chalk, and burns with great brilliancy until consumed, leaving no ashes. The discoverer states that there is a whole mountain of this strange substance, and fears some wretch may set it on fire and burn up the range. This substance is very valuable, and is used in the manufacture of paraffine for candles and other products.

BLACK HILLS COAL.—The Black Hills *Herald* of the 14th inst. says: "Yesterday afternoon 4000 pounds of iron were sucessfully melted at the Gayville foundry with Black Hills coal; the amount used was about 700 pounds. This coal came from the Red Water mines from a depth of not over 12 feet from the surface. It is of the bituminous variety, makes a beautiful fire, and is lasting. Men who use this coal here are highly delighted over this strike and its success, as heretofore they were obliged to pay as high as eight cents a pound, or $160 per ton, for coal shipped from Chicago, while the cost of this, our own coal, will not exceed a cent and a half per pound, or $30 per ton, delivered here from the new coal regions. It is only a matter of time, until the coal consumers of the Hills will find it necessary that a railroad be built from Central City to these new coal ledges; for the pines on our hills are becoming scarce and valuable, and within the next two years it will be found cheaper to burn coal, freighted in from the mines by wagon, than a poor quality of wood gathered up from here and there on our mountain sides."

GENERAL MINING NEWS.

NEVADA.

THE COMSTOCK.

From the *Gold Hill News* of the 15th instant we condense the following:

"Stocks have gradually strengthened during the entire week, based upon a near approach of the Sierra Nevada incline to the 2300 level, the reaching of the ore vein by the east drift on the 2200 level of the Ophir, and the completion of the lightning drift on the 2000 level of the Hale & Norcross, and the drainage of the flooded mines at no very distant day.

"The bullion yield of Ophir for the month of December was $69,866, or a little over $82 per ton for the amount of ore milled.

"California continues a daily yield of 330 tons of ore of a good quality, and 75 tons per day of good ore is being extracted from the 1300 and 1400 levels of the Consolidated Virginia.

"The Justice is yielding 40 tons per day, which is being crushed as fast as it is extracted.

"The daily yield of the Trojan amounts to 40 tons, with a steady increase in the assay value of the pulp and car samples.

"The flow of water is still quite strong at the Osbiston shaft of the Gould & Curry and Best & Belcher mines, but shows signs of weakening.

"The lightning drift on the 2000 level of the Hale & Norcross has connected with the Combination shaft, and the pipes are being laid preparatory to turning the floods of the lower levels of the Savage and Hale & Norcross mines through the Sutro Tunnel. The new double line of 15-inch pumps of the Combination shaft have been given a good trial and found to work with the utmost perfection, so that all that remains to be done to commence the work of drainage is to complete a proper line of connections between the three mines.

"The flood of hot water on the 2000 level of the Julia is still too great to permit of an advance in the drift where it was struck and the recent good ore prospects were found. The south branch of the Sutro Tunnel is rapidly approaching the Julia shaft, and, if nothing serious happens to prevent, will complete a connection in three or four weeks more, when no further trouble with the water will be experienced.

"In the Bullion, Yellow Jacket, Belcher, Overman, and other mines, the usual amount of prospecting is being done."

CONSOLIDATED VIRGINIA MINING CO.—ANNUAL REPORT.—The annual meeting of this company was held in San Francisco on the 9th inst. We condense the following from the reports of the company during the year 1878. The superintendent's statement of the bullion account of the mine is as follows:

Tons of ore on hand December, 1877	1,400½	
" " extracted	122,821⅜	
		124,231⅞
Tons of ore reduced		123,624¾
Tons or ore remaining on hand December, 1878		607⅛
Total cost per ton		$19 93 4-5

Bullion Yield for Year:

Gold	$3,770,007.98	
Silver	4,226,745 13	
		$7,996,753.11
Ounces of fine silver		3,269,197.1-5
Average value per ounce Dore		$2.30
Average ore value per ton, net		64.68
Weight, tons		118⅝

Total Production to Date:

Gold	$26,831,605.37	
Silver	33,901,277.26	
		$60,732,882.63
Ounces of fine silver		26,141,851 9-10
Weight, tons		1,101½
Bars		17,027

"In addition to the ore extracted there have been raised from the mine in the past year 28,323 tons of waste rock.

"1200 Level—There are no reserves of productive ore.

"1300 Level—Some low-grade ore has been developed, but the existence of large bodies of water to the east of the ore-body has prevented us from doing the full amount of prospecting in this direction which is desirable. Arrangements are now being made to drain the water through the 1500 level to the C. & C. joint-shaft, which accomplished, this level can be more thoroughly explored.

"1400 Level—The ore has not yet been reached by the new work inaugurated.

"1500 Level—The south drift and cross-cut No. 2 have been reopened and connected with the main drift on this level leading to the C. & C. joint-shaft. This gives the required ventilation and will enable us to extract the ore which remains on this level to good advantage, and also forms a portion of the system of connection desired to carry off the water which is known to exist to the east of the ore-body, on the levels above.

"1550 Level—During the year no developments have been made.

"1650 Level—Extensive explorations have failed to develop any thing new or of any value.

"1750 Level—Most of the milling ore has been extracted, but some will yet be taken out by following small streaks that occur through the mass of low-grade ore.

"1850 Level—At a point in cross-cut No. 2, 50 feet from the main south drift, a drift was run in a southwesterly direction to intersect cross-cut No. 3, in which drift ore of good quality was found, evidently being the same ore-body which was developed to the east of the main vein on the 1750 level, but much wider, the sill floor being 20 feet wider by 30 feet long. Winze No. 3, sunk from the 1750 level, has been connected with the stopes, and good ventilation has been secured. This winze has been continued down to the 1950 level, passing vertically through ore for a distance of 40 feet, when west clay was struck, and from this point the winze followed the slope of the clay to the level below. Favorable-looking vein matter and ore giving low assays have been encountered on the 1950 level, and preparations are being made to open the 2150 level from the C. & C. shaft."

The report says it is intended to run the C. & C. shaft to the 2350 level as soon as practicable and continue explorations from that point.

The Secretary's report is as follows:

RECEIPTS.

Gross product yield of mine for year	$7,996,753.11	Balances outstanding last annual meeting, since settled	$1,100,446.12
Assaying	46,389.81		
Total			$9,143,589.04

DISBURSEMENTS.

W. H. Patton Superintendent's account cash balance in Virginia	$5,784.43	Advertising	$252.25
		Water	2,500.00
Bullion	157,758.88	Real estate	9,000.00
Cash	1,152.70	Hoisting	71,772.92
Nevada Bank—cash in bank	174,930.29	Taxes	208,997.48
Pumping	11,497 01	Reduction	1,295,226.00
Virginia office expenses	1,777.65	Interest and exchange	64,973.48
Team account, Virginia	855.02	Bullion freight	25,627.25
Ore purchase	102,513.00	Dividends	5,400,000.00
Bullion samples	1,396.67	Legal expenses	48,041.01
Surveying	100.00	C. and C. shaft	89,500.00
Assay office expenses	37,138.62	Bullion discount	546,794.36
Best and Belcher joint winze	14.451.79	Supplies	222,125.98
Books and stationery	2,868.65	Salaries and Wages	641,543.00
		Expense	5,046.60
Total			$9,143,589.04

Referring to the outlook for the coming year, the superintendent says: "I will conclude this review of the past year's operations by saying that, although the developments made in the mine during the year have not warranted the resumption of dividends, it must be understood that a large extent of ground remains unexplored on the 1850 and 1950 levels, and that explorations have only just been commenced on the 2150 level. The chances which still exist for developments of ore in these three lower levels, taken into consideration with the fact that our lowest (the 2150) level is 260 feet higher than the top of the late ore developments in the Sierra Nevada mine, give favorable hopes for the future."

THE BULLION MINING CO.—The annual meeting of this company was held in San Francisco on the 9th inst. The receipts of this company for the year were $418,232.54, principally derived from the proceeds of three assessments. The principal expenditures were on labor account, the total being $63,471.

PROPOSALS.

For the benefit of many of our readers, we compile weekly such proposals and solicitations for contracts, etc., as may be of interest. The table indicates the character of proposals wanted, the full name and address of parties soliciting, and the latest date at which they will be received:

Cast-Iron Water-Pipe, 11,000 feet, 36 inch; W. H. Perry, Water-Works Committee, Nashville, Tenn	Jan. 25, 1879
Coal for city of Cumberland, furnishing the same for one year, tons of 2240 lbs.; K. H. Butler, Cumberland, Md	" 27, "
Feed and Bedding for Horses of Fire Department for year 1879; Department of Fire and Buildings, Brooklyn, N. Y	" 28, "
Cleaning the Streets and removing dirt, ashes, etc., from Feb. 1st, 1879, to Dec. 31st, 1879; Department of City Works, Brooklyn	" 30, "
Blanks, Blank books, Stationery, etc., for use of Department of Fire and Buildings; Department of Fire and Buildings, Brooklyn	" 31, "
Granite Monument, Furnishing and Erecting; Department of City Works, Brooklyn, N. Y	Feb. 3, "
Army Transportation; Charles H. Tompkins, Deputy Q. M. Gen., U. S. A., St. Paul, Minn	" 10, "
Monument—Granite and Bronze; M. Nichols, Chairman Monument Committee, Buffalo, N. Y	March 1, "
Gas Illumination of Rio de Janeiro, Brazil; Salvador de Mendonca, Brazilian Consul-General, 42 Broadway, New York City	" "
Locks and Keys for Mail Bags; D. M. Key, Postmaster-General, Washington, D. C	" 20, "
Coal for Schools of Youngstown Board of Education, Youngstown, O	" 29, "
Railroad Grading; P. Bremond, President of the Houston, East & West Texas Railway, Houston, Tex	

The City of Paterson, N. J., is supplied with water by a private corporation, and, as the 10 years' contract expires next year, the project of the city's building new works is again agitated. The city's annual rental now is about $18,000.

Colorado Railroad Extension.—Articles of incorporation have been filed by the Rosita & Silver Cliff Railroad Company. The company proposes to construct and operate a line of railroad from Cañon City, up Grape Creek and Wet Mountain Valley to Rosita, with branches extending to Kaufman Gulch, to Silver Cliff, and to the mouth of Texas Creek. The capital stock is $500,000, divided into 5000 shares, at $100.

The Proposed New Bridge across the Harlem.—At a meeting of the Park Commissioners on the 22d inst., a memorial received from a number of citizens on December 11th, 1878, asking that a suspension bridge be constructed over the Harlem River north of, and within half a mile of, High Bridge, was acted upon by the adoption of resolutions making a requisition on the Comptroller for bonds to the amount of $5000 to begin the work. The Engineer of Construction was directed to transmit plans and specifications for the proposed bridge and an estimate of its cost. An act of the Legislature passed in 1871 authorizes the building of the bridge, and the property necessary for approaches to it, on both sides of the river, has been acquired by the city.

ASSAY DEPARTMENT OF THE ENGINEERING AND MINING JOURNAL.

This department is opened for the benefit of miners, prospectors, and others interested in minerals.

Replies will be made in these columns, and *without charge*, to questions asked regarding the nature and commercial value of minerals, and of samples sent.

Assays determining the actual composition and value of ores will be made at the following rates. All assays are made with the utmost care by the most experienced and competent assayers:

Assay for Gold	$2.00	Assay for Copper	$2.00	Assay for zinc	$3.00
" Silver	1.50	" Lead	1.50	Zinc analyses	5.00
" Gold and silver	2.00				

The amount should invariably accompany the order, and expressage or postage must always be prepaid.

Communications, samples, etc., to be addressed to

ENGINEERING AND MINING JOURNAL, 27 Park Place, New York.
(P.O. Box 4404.)

STATISTICS OF COAL PRODUCTION.

This is the only Report published that gives full and accurate returns of the production of our Anthracite mines.

Comparative statement for the week ending Jan. 18th and years from January 1st:

TONS OF 2240 LBS.	1879.		1878.	
	Week.	Year.	Week.	Year.
Wyoming Region.				
D. & H. Canal Co..	47,184	96,727	56,371	148,627
D. L. & W. RR. Co.	49,629	126,977	43,553	122,753
Penn. Coal Co.....	13,008	32,247	5,436	38,321
L. V. RR. Co.....	13,526	28,467	33,928	75,061
P. & N. Y. RR. Co..	324	497	148	949
C. RR. of N. J.....	13,051	17,601	31,257	68,083
	136,722	302,516	170,693	453,796
Lehigh Region.				
L. V. RR. Co.....	31,410	66,831	78,754	158,534
C. RR. of N. J.....	27,743	46,820	15,405	38,015
S. H. & W. B. RR..	.....	686	.....	.....
	59,153	114,337	94,159	196,549
Schuylkill Region.				
P. & R. RR. Co	95,890	210,664	2,122	103,788
Shamokin & Lykens Val....	5,694	21,279	5,038	18,220
	101,584	231,943	7,150	122,008
Sullivan Region.				
Sul. & Erie RR. Co.	1,125	2,665	789	2,136
Total	298,584	650,873	272,791	774,488
Increase.....	25,793	.....	.....	.....
Decrease	.....	123,615	.....	.....

The above table does not include the amount of coal consumed and sold at the mines, which is about five per cent of the whole production.

Belvidere Delaware Railroad Report for week ending Jan. 18th:

	Week.	Year. 1879.	Year. 1878.
Coal for shipment at Coal Port (Trenton)	.....	.....	.....
Coal for shipment at South Amboy	5,547	9,739	64,770
Coal for distribution.....	4,855	9,927	10,788
Coal for Company's use	2,148	3,902	6,112

Receipts and shipments of coal at Chicago Ill., for the week ending Jan. 18th, and year from January 1st:

	Week. Tons.	Year. Tons.
Receipts.....	31,289	69,465
Shipments.....	6,927	16,741
Perth Amboy Business:		Tons.
Received for the week		7,983
Shipped for the week.....		15,159
On hand Jan. 18th..		89,297

The decrease of shipments of Cumberland Coal over the Cumberland Branch, and Cumberland and Pennsylvania railroads, amounts to 13,394 tons, as compared with the corresponding period in 1877.

The Production of Coke for the week ending Jan. 14th:

Tons of 2000 lbs.	Three days.	Year.
West Penn R. R....	1,856	3,782
Southwest Penn. R. R.....	17,729	30.568
Penn. & Westmoreland Region, Pa. R. R.	1,872	3,256
Pittsburg, Penn. R. R.....	2,446	5,728
Penn. R R. (Allegheny Region).....	1,334	2,165
Total...	25,237	45,499

The Production of Bituminous Coal for the week ending Jan. 18th was as follows:

Tons of 2000 lbs., unless otherwise designated.

	Week. Tons.	Year. Tons.
Cumberland Region, Md.		
Tons of 2,240 lb.....	13,385	31,131
Barclay Region, Pa.		
Barclay R. R., tons of 2,240 lbs.....	4,820	14,935
Broad Top Region, Pa.		
Huntingdon and Broad Top R. R.....	†	3,245
*East Broad Top.....	1,759	3,101
Clearfield Region, Pa.		
*Snow Shoe...	1,106	1,680
*Tyrone and Clearfield.....	25,720	37,969
Allegheny Region, Pa.		
*Pennsylvania R. R	3,833	5,820
Pittsburg Region, Pa.		
*West Penn R. R.....	3,838	6,346
*Southwest Penn. R. R.....	677	1,242
*Penn & Westmoreland gas coal, Pa. R. R.....	12.884	26,186
*Pennsylvania R. R..... ..	8,198	14,729

*For the week ending Jan. 14th.

† This report was not received this week.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Jan. 24, 1879.

Anthracite.

There has been a very fair business, and the outlook is favorable to its continuance. The stocks in first hands are, as a rule, very light, and the supplies coming forward are, from sundry causes, small. The same position in almost any other article of merchandise would be pronounced a favorable one, but some of the coal managers, perhaps owing to their accustomed dependence on a Board of Control to say what prices should be, are unable to appreciate the situation, and actually appear to be "bearing" the market. The contracts made by the Delaware & Hudson Canal Co., which we announced in our last, seem to have displeased the Pennsylvania Coal Co., which has issued a circular to the trade containing the following prices:

Steamer.....	$2.50	Stove.....	$2.85
Grate.....	2.50	Chestnut....	2.60
Egg.....	2.50	Small chestnut.....	2.00

and these prices are actually shaded by dealers in this coal, to whom commissions are allowed. The Delaware, Lackawanna & Western Railroad Company announces an auction sale of 100,000 tons of coal, to take place on the 29th inst. In the case of the Pennsylvania Coal Company there is evidence of war, but we are unable to see what occasion there is for this course or what advantage can be expected from it. On the contrary, the condition of the market is such that an increase instead of a reduction in prices might not unreasonably be expected. The Delaware, Lackawanna & Western Railroad Company may find it necessary to sell 100,000 tons of coal for February delivery; but did it not wish to impress somebody with its importance, it could probably have got along with 75,000 tons. The trouble seems to have originated with the Delaware & Hudson Canal Company, which first sold below the market.

The Lehigh & Wilkes-Barre Coal Company, the Philadelphia & Reading Coal & Iron Company, and other companies are now, and have all along been, getting better prices than are asked by the Pennsylvania Coal Company, and we therefore conclude that a mistake was made in reducing prices.

There is not the faintest indication of a coal combination. The usual amount of talk on the subject is kept up on Wall street, but we are unable to see any indication of it away from that center. The Lehigh Valley RR. Company showed, at its annual meeting on Monday, that the combination had been a positive injury to it. If the managers of the coal companies will go to work to make the most out of their own business, instead of trying to get the best of their competitors, they will probably do better than in any year since 1873. Prices should not average this year as low as they did in 1877. The indications are that the demand will be fully as large as, if not larger than, in that year, while the ability to produce has been greatly reduced from two causes—first, the stoppage of "dead-work" at the mines, and, second, a large decrease in the supply of labor.

The Reading Company is selling coal alongside at this city, as follows:

Hard coal: Broken, $3; egg, $3; stove, $3.25, and chestnut, $2.80. Free-burning: broken, $2.80; egg, $2.80; stove, $3.25, and chestnut, $2.80.

The production of anthracite coal last week was 298,584 tons, as against 248,508 tons the previous week, and 272,791 tons the corresponding week of 1878. The total production from January 1st to January 18th was 650,873 tons, as compared with 774,488 tons for the like period of last year, showing a falling off this year of 123,615 tons.

The Philadelphia & Reading Railroad Company has issued the following circular:

"PHILADELPHIA, January 23, 1879.

"On and after Monday, January 27th, 1879, a charge of *fifty cents* per four-wheel car, and *one dollar* per eight-wheel car per day will be made on all cars of anthracite coal not unloaded on the day of delivery at Port Richmond, and, in addition to this charge, the number of cars so standing loaded will be deducted from the *pro rata* distribution of empty cars to the colliery from which said loaded cars were shipped."

Bituminous.

There has been no business of importance to note. The harbor at Baltimore is more accessible.

Philadelphia. Jan. 23, 1879.

The local trade remains active. The coal cars of the Reading have been scattered in all directions, and the delays caused by the snow-storms and cold weather have caused accumulations and impediments which interfere so much with the handling of the cars that the supply of light cars at the mines is quite low, although the actual needs would not amount to more than one half of the full business.

The river continues blocked with ice, and no coal is shipped from Port Richmond, except by the iron colliers. No rate of freight is established, and none will be until the river is open, when a brisk trade may be looked for.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Jan. 24, 1879.

American Pig.—There has been but very little business, although there is said to have been some inquiry. The consumptive wants are very small yet, and there is not a trace of speculative spirit. We quote No. 1 Foundry at $16@$18; No. 2 Foundry, $15@$17; and Forge, $14@$15. Shipments have been disturbed by ice in harbor.

Scotch Pig has been selling in but a small way at the following prices: Eglinton, $19.50@$20, and Coltness, $22@$22.50.

Rails.—There is no business reported. The Erie Railway is receiving bids for 25,000 tons of steel, and there is a liberal amount of inquiry from other sources. We quote steel rails, at mills, at $40@$41, and iron rails at $32@$36. The accumulation of orders by the steel mills gives rather a firmer tone to prices.

Old Rails.—We note a sale of about 1500 tons, at $19.75, and quote at $19.50@$20.

Wrought Scrap.—We learn of no business. The stock is small, and the asking prices range from $22 @$22.50.

Our Richmond (Va.) correspondent says: "There is a better demand for foundry grades of pig-iron. Old rails remain firm."

Our Columbus (Ohio) correspondent writes:

"There has been but very little change in the condition of the market since our report of last week. The demand has increased; and sales made are at good figures. Producers are unwilling to book orders for future delivery at present prices. With the increased demand, and a disposition on the part of furnace men to make no concessions to effect sales, we must certainly look for a more cheerful state of affairs in the iron trade the coming year. Quotations remain unchanged."

Pittsburg advices, under date of January 21st, say:

"The past week has developed a slightly improved inquiry for pig-iron, but the demand is still only for the best brands, and in small lots for immediate use. Foundry iron remains exceedingly dull, and shows some tendency to lower prices, although there is no quotable change as yet from last report."

Philadelphia. Jan. 23, 1879.

[Specially reported by JUSTICE COX, JR., & Co., Iron Merchants, 333 Walnut street, Philadelphia.]

Pig-Iron.—This branch of the iron trade continues dull and depressed; little iron is changing hands, but all hope for a good trade on the opening of navigation. The large contract just closed by the Phoenix Iron Company, it is hoped, will put new life in business for the time. We quote: No. 1, $17 to $19; No. 2, $16 to $18; Gray Forge, $15 to $17. All Philadelphia delivery.

Manufactured Iron.—The bar trade is not in a flourishing condition, yet most mills in this neighborhood continue to run on orders, and have about all they can do on small orders. The plate mills continue fairly busy on orders, some large ones having been taken in the last few weeks. We quote: Bars, 1¾ to 2c. per lb.; plate and tank, 2⅛ to 6c. per lb.; skelp is dull, at 1 9-10 to 2c. per lb.

Rails.—The steel-rail mills continue busy at quoted prices. In iron rails, nothing new is reported at this time. Most mills are running on small orders for light rails. We quote: Steel, $40 to $44; iron, $32 to $35; all at mills.

Old Rails.—The market for old rails is reported firmer, and selected lots are in demand. We quote at $19 to $21, as to delivery and quality.

Muck Bars.—There is quite a demand for muck bars, but consumers and producers are far apart as to price. We quote at $30 to $33, as to quality.

Scrap.—Wrought is quoted dull at $20 to $22; cast, $12 to $16.

Old Wheels are quiet at $17 to $19

METALS.

NEW YORK, Friday Evening, Jan. 24, 1879.

There has been another very good week's business done, and the feeling in the metal trade is better than for years.

RECEIPTS OF METALS AT NEW YORK FOR THE THREE WEEKS ENDING JANUARY 23d AND YEAR FROM JANUARY 1ST, 1879.

	.....	Jan. 9	Jan. 16	Jan. 23	Year from Jan. 1.
Copper, bbls.....	.....	96	72	167	335
Copper, boxes....	.....	.....	.....	.....	.....
Copper, cakes....	.....	109	.....	129	238
Lead, pigs.....	.....	3,854	4,921	2,515	11,290
Spelter, pieces...	.....	1,725	2,780	5,125	9,630
Quicksilver, flasks	.....	.....	.....	.....	.....

Copper.—The large business noted in our last is now said to have amounted to between 4,000,000 and 5,000,000 lbs. As it was all done with manufacturers, there is naturally but a very small demand from them now, and the market closes at 15½c. There is a rumor that negotiations are under way to sell some copper for export. As it is not possible to get so good a price abroad as was obtained last week from our domestic manufacturers, there will probably be a system of bearing to get the mining companies to dispose of their surplus at such figures as Europe may be willing to pay. In fact, we see evidences of this already.

From London, under date of January 9th, we have received the following:

"Copper was a shade firmer to-day; but the only business reported was a small lot of Chili bars, of a common brand, at £57. at which figure buyers seemed inclined to extend their purchases, had any more metal been offering thereat. The same price was also bid for favorite marks, though without success, and for these holders spoke as if they would not care to accept a contract below £57½. In best brands there were one or two small parcels obtainable, at £58, and for these £57½ was declined. We call G. O. B's £56¾ to £57¼, at which latter rate a fair quan-

tity of stuff is on sale, while purchasers talk of £57 as the outside price they would be disposed to give."

Tin.—Straits in London is quoted at £59 10s., and in Singapore $18.30. The arrivals since our last have amounted to over 6000 slabs, and the Castillia is momentarily expected with 2400 slabs. Despite these large arrivals, there has been so good a jobbing demand as to almost counteract their effect, although there has been a slight decline in prices. We quote Straits at 14¼@14½c.; L. & F., 14¼@14⅝c., and Refined, 14¼@14⅝c.

Under date of January 9th, we have received the following from London:

"Bear sales, for delivery any time during the year, in seller's option, have been made at 57@58s., net, the former price having been accepted yesterday only. These transactions are, of course, of an isolated nature, as most people are very loth to enter into any business of which the risks extend over so long a period. The cash sales to-day were about 30 tons, at 59½@60s.; some 20 tons short-prompt also selling at the lower figure. The Dutch Trading Company declare 19,500 slabs Banco, and 3400 Billiton, for sale on 28th inst."

According to Messrs. Vivian, Younger & Bond, the statistical position of tin on January 1st, as compared with November 1st and January 1st, 1878, was as follows:

	1878. Nov. 1.	1878. Dec. 1.	1879.	1878.
Foreign tin in London	9,339	9,385	9,428	8,479
Banca tin in Holland	1,240	1,704	1,562	1,172
Banca tin (in company's hands)	1,112	440	700	876
Billiton tin in Holland	1,674	1,581	1,810	1,203
	13,365	13,110	13,500	11,730
Quantity of tin afloat for Europe	3,800	4,500	5,000	3,800
Quotations on the same dates, being for Straits	£60	£64	£61	£65 10s.

Tin Plates.—Prices in Liverpool are very firm and advancing, owing to large purchases on American account. There is a very large jobbing and wholesale business doing here, while retail prices have been advanced 50c. per box. The market closes with a strong upward tendency. We quote as follows: Charcoal, bright, ⅛ X Melyn grade, $6.25@$6.37½, and Allaway grade, $6.12½@$6.25; charcoal ternes, Allaway grade, $5.50; coke, bright, B. V. grade, $5.37½, and coke roofing, 14×20, $5.12½.

Messrs. Robt. Crooks & Co., of Liverpool, under date of Jan. 9th, say of tin and terne plates:

"The chief feature has been the somewhat rapid advance in Coke Tins and its almost complete maintenance so far. Makers, although not protected by forward bookings, are most confident, and show no signs of giving way. Second-hand holders, the last day or two, have, however, accepted lower rates, and this may be taken as an indication that buyers are able to hold back. If this continues, prices must break. Charcoal Ternes, having been somewhat freely booked are now quoted 3d to 6d above lowest points, and the same applies to Coke Ternes. Charcoal Tins of almost every description, with the exception of a few favorite brands, are very dull, and undoubtedly present best value in the market."

Lead.—The business in ordinary lead has amounted to from 100 to 150 tons, at 4½c. The nominal price at the close is 4⅝c., with an upward tendency. Refined lead is quoted at 4¾c.

The exports of pig lead from London and Liverpool during 1877 and 1878 were as follows:

	1877. Tons.	1878. Tons.
To Madras	19	227
To Calcutta	229	764
To Bombay	202	280
To China	14,709	9,913
To Japan	1,760	869
To Singapore and Penang	500	216
	17,419	12,269

Ordinary brands of soft Spanish lead were quoted in London January 1st, at £14 7s. 6d. per ton.

Spelter and Zinc.—Sheet zinc is in moderate request, and is quoted at 4¾c. Spelter is unchanged at 6¼@6½c.

Antimony.—With but a moderate business, this article is quoted at 12@12¼c., according to brand.

Quicksilver.—The San Francisco *Commercial Herald* of January 16th says: "There is no special demand at date, and with large stocks in London, Hong Kong, and in San Francisco—say in all 75,000 flasks or more, being nearly a year's consumption—we see little hope for a rise at present. Receipts for the week, 1200 flasks."

The receipts of quicksilver at San Francisco in 1878 were 69,192 flasks, against 69,886 in 1877. The exports during the two years were as follows:

To	1877. Flasks.	1877. Value.	1878. Flasks.	1878. Value.
New York	818	$226,847	200	$6,350
Mexico	8,350	290,166	10,812	347,927
New Zealand	270	9,457	174	5,610
China	31,210	1,112,067	20,445	703,988
Japan	388	14,281	690	22,702
Central America	80	2,996	102	3,305
Australia	1,550	54,707	422	13,843
Honolulu	1	38	.....	.....
British Columbia	19	742	30	990
South America	3,544	122,439	1,405	45,975
Calcutta	50	1,570	.....	.....
Total	46,280	$1,635,310	24,280	$1,150,690

THE BULLION MARKET.

NEW YORK, Friday Evening, Jan. 24, 1879.

There has been an important advance the past week in silver in London, based on an improvement in the East India exchanges, and we have to notice an advance of 1¼c. per ounce for fine silver in our own market. There has been a decline in London to-day, since the opening, of ⅛d. on the statement that Germany would not sell under 51d. If it were not for the apprehension that Germany will sell, there can be little doubt that silver would rule at better rates. London closes at 50⅞@51d.; New York, $1.11, and San Francisco, 15 per cent discount.

DAILY RANGE OF SILVER IN LONDON AND NEW YORK, PER OZ.

Date.	London Pence.	N. Y. Cents.	Date.	London Pence.	N. Y. Cents.
Jan. 18	50⅝	109¾	Jan. 22.	50½@¾	*
Jan. 20	50½	110	Jan. 23.	50⅝	110¾
Jan. 21	50½	110¼	Jan. 24.	50⅞@51	111

* 110¼@110¾.

BULLION SHIPMENTS.

We give below a statement showing the latest bullion shipments in addition to those announced in our issue of January 18th:

Jan.	8,	Northern Belle	Nev.	$6,741.07
"	8,	Ophir	"	19,459.46
"	8,	Pioche	"	9,202 00
"	11,	Infidel	"	5,063.05
"	11,	Grand Prize	"	12,813.22
"	11,	Navajo	"	9,222.71
"	11,	Alexander	"	8,610.10
"	7,	Eagle	Cal.	9,261.09
"	9,	Standard	"	14,774.51
"	9,	Bodie	"	12,500.00
"	10,	Black Jack	Idaho	1,764.79
"	10,	Douglas	"	6,940.40
"	11,	Silver Reef	Utah	15,091.00
Jan.	10,	Tybo Con	Nev.	3,827.99
"	13,	Silver Prize	"	23,000.00
"	14,	Hil side	"	6,700.00
"	15,	Manhattan	"	11,068.61
Oct.	—,	Homestake	Dak.	51,729.00
"	—,	Golden Terra	"	4,369.00
"	—,	Caledonia	"	5,352.00

Production of the Bodie Mines during 1878.—The following table summarizes the yield of the producing mines of the Bodie District during the past year:

Bodie	$1,042,236.80
Standard	1,025,383.35
Bechtel	50,184.93
Red Cloud	1,927.50
Total	$2,129,732.58

From the above it will be seen that the Bodie mine, although producing but five months, heads the list with $1,042,236.80, the Standard falling a few thousands short of that amount. The Bechtel and Red Cloud made shipments through Wells, Fargo & Co., although there were several other small runs made of sample lots, the product of which were either sent down in crude shape or through some other source. The Black Hawk made a small run last spring. The Consolidated Pacific Company had a run of about $4000 during December at the Miner's mill, which is not recorded in the shipments given, and bullion of about the same value was produced from the run of Sitting Bull ore, which was not completed until the present month. Uncle Dan Olsen was running the arastras at Rough Creek during the summer, and had quite a handsome yield from his Last Chance mine. How he disposed of his bullion does not appear.

The following table exhibits the proportions by each mine of gold and silver produced:

	Gold.	Silver.
Standard, per cent	93½	6½
Bodie	87½	12½
Bechtel	90	10
Red Cloud	50	50

The following table shows the shipments from Bodie District in 1877:

Standard	$784,522.80
Red Cloud	9,000.00
Mexican	2,000.00
Kate Rogers (now Sun mit)	1,500.00
Total yield in 1877	$797,022.80

It will thus be seen that Bodie has produced nearly three times the amount in 1878 that it did in 1877.

Yield of the Bonanza for 1878.—The product of the California and Consolidated Virginia mines for 1878 was as follows:

	Gold.	Silver.	Total.
California	$5,553,404	$5,395,675	$10,949,079
Cons. Virginia	3,770,008	4,226,745	7,996,753
Totals	$9,323,412	$9,662,420	$18,945,832

Yield of Arizona Mines for 1878.—The Prescott *Enterprise* of the 4th inst. gives the bullion yield of certain Arizona mines for 1878 as follows, in round numbers:

McCrackin Consolidated	$800,000
Signal	100.000
Hackberry	200,000
Mineral Park	150,000
Peck	300,000
Tip Top	150,000
Aztlan	30,000
Smith's Mill	120,000
Silver King	480,000
Total	$2,330,000

There have been shipped from the Pioneer and Globe Districts, for the eleven months ending November 30th, 1878, ores, concentrations, and bullion amounting to $906,-815.32. This includes McMillen.

There have been shipped from the Miami mill recently 4850 ounces of silver bullion and 277 ounces of gold bullion.

Specie Exports from New York.—The exports of specie from the port of New York for the week ending on Saturday, January 18th, amounted to $414,216, of which $201,-130 were Mexican silver dollars, $5334 Mexican silver bullion, $9200 American silver coin, $178,000 American silver bars, $18,000 American gold coin, and $2252 English gold coin, making the total exports of silver for the week $393,664, and of gold $20,552.

FINANCIAL.

New York Stocks.

NEW YORK, Friday Evening, Jan. 24, 1879.

There has been a very active business and a strong and advancing market. It has been so strong that the efforts of the coal companies to thoroughly upset the coal trade only seemed to be a "bull" argument. Delaware & Hudson Canal sold to the extent of 10,538 shares, at 41@45¼, closing at 44¾. Delaware, Lackawanna & Western records 259,764 shares, at 47¼@53⅛, closing at 53⅝. New Jersey Central stock shows the very large total of 52,080 shares, at 38@42 closing at 41⅝.

The Maryland Coal Co. will hold its annual meeting February 4th.

The Fulton Coal Co. has declared a dividend of 3 per cent.

The Locust Gap Improvement Co. has declared a dividend of 6 per cent.

The Diamond Coal-Land Co. announces a dividend of 2 per cent, or $1 per share, payable on demand.

AUCTION SALES.

Flint & Pere Marquette RR. Co.—$500 of the 10 per cent land-grant bonds, due 1888, at 102 per cent

Lacy Farm Oil Co.—300 shares, at $3 per share.

Oil Creek RR. Co.—$1000 of the 1st mortgage 7 per cent bonds, at 77¾ per cent.

Chesapeake & Delaware Canal Co.—$3000 6 per cent bonds, at 70 per cent.

Chemical Copper Co.—822 shares, at 1c. per share.

ANNUAL MEETINGS:

Pennsylvania Warehousing Co., February 3d.
Tremont Coal Co., February 4th.
Union Canal Co., February 4th.
Huntingdon & Broad Top Mt. RR. Co., February 4th.
Excelsior Coal Mining Co., February 12th.

Miscellaneous Stocks and Quotations.

Sales and quotations of the stocks and bonds dealt in here, at Philadelphia and Baltimore, for the week ending the 24th inst. are given in the following tables. The Philadelphia quotations will have a * affixed. The Baltimore quotations are indicated thus †.

Stocks.	Par Value.	High'st	Lowest	Closing	Sales: Shares.
American Coal Co.	$25	.....	.....	30	.....
St.L.,I.M.& S.R.Co.	100	17	15⅝	16½	2,354
Spring Mt. Coal Co.	50	.....	.....	50	.....
*Cambria Iron Co.	50	.....	.....	60	.....
*Penn. Salt Mf'g Co.	50	.....	.....	70	25
*Westm'land C. Co.	50	.....	.....	45	.....
*Buck Mt. Coal Co.	50	.....	.....	38	.....
*Schuyl. Nav. Co.	50	.....	.....	.....	.....
†B.&O.RR.Co.1st pf	.....	.....	.....	97	.....
†B.&O.RR.Co.2d pf	100	.....	.....	92½	.....
" " " com	90	93½	89¼	92	235
†George's C'k C. Co	100	.....	.....	50	.....
†S. Clara M'g Co.	100	.....	.....	25	.....
†Atlantic Coal Co.	10	.....	.....	85	.....

Bonds.	Prince'l. When Due.	Int'est. When Due.	High'st.	Lowest	Amount.
D., L. & W., 7s, conv	1892	J. & D.	103	.....	5,000
" " " " 2d mtge.	1881	M. & S.	106½	.....	1,000
N.J.C.,1stmtge.new	1890	F. & A.	117¾	.....	6,000
" " " 1st mtge.,con	1899	Q.	100	.....	†466,000
" " " convt.	1902	M. & N.	80	78¾	*53,000
Lehigh & W. B., con	1899	Q.	65	.....	‡203,000
Am. Dock & Imp. 7s	.....	J. & J.	60	.....	§12,000
St.L.I.M.& S..1st mt	1892	F. & A.	.....	.....	.....
Ches. & O., 1st mtge	1899	M. & N.	.....	.....	.....
D & H C Co.,1stm.rg	1884	J. & J.	97½	97	9,000
" " " " " "	1891	J. & J.	97¼	96½	33,000
" " " " " m.loan cp	1894	A. & O.	99½	98	2,000
" " " " " rg.	1894	A. & O.	98¾	.....	1,000
" " " " " new mge.	.....	.....	.....	.....	.....
*L.V.R.,1stm.6s.cp.	1898	J. & D.	112	.....	1,000
" " " " rg.	1898	J. & D.	.....	112	.....
" " " 2d m. 7s,rg.	1910	M. & S.	.....	117	.....
" " " con.m.6s,rg	1823	J. & D.	101½	100¼	47,000
" " " " 6s cp.	1923	J. & D.	101	100⅝	28,000
*Pa.RR.,1st m.6s,cp	1880	J. & J.	.....	.....	.....
" " g. m., 6s, cp.	1910	J. & J.	110½	.....	1,000
" " " 6s, rg.	1910	A. & O.	.....	113	.....
" " con.m.6s,rg.	1905	Q.	.....	101	.....
" " " 6s, cp.	1905	J. & D.	101¾	101¼	38,000
" " new loan, 5s	.....	.....	.....	.....	.....
*P.& R. R., 1st m.6s, R. C. 43-44	1880	J. & J.	.....	.....	.....
P. & R. R., 1st m. 6s, R. C. 48-49	1880	J. & J	101½	.....	4,000
P.& R. R.,2d m.7s cp	1893	A. & O.	.....	112	.....
" " " scrip	1882	J. & J.	50	49½	7,150
" " " in.m.7s,cp	1896	J. & D.	.....	.....	.....
" " " c.m.7s,cp.	1911	J. & D.	101¾	100½	14,000
" " " 7s. rg.	1911	J. & D.	.....	102⅛	.....
" " " cvt.7s,R.C	1893	J. & J.	.....	46	.....
" " C.& I.Co.,Deb 7s, R. C.	1892	M. & S.	.....	.....	.....
& R.C.& I. Co., m. 7s, R. C.	'92-3	various	.....	.....	.....
*L.Nav.Co.,6s,rg.m.	1884	J. & Q.	.....	104	.....
" " RR., rg. m.	1897	F. & Q.	.....	106	.....
" " cvt. co. G. R.	1894	M. & S.	.....	.....	.....
" " " Gold R. C.	1897	J. & D.	92	91¾	8,500
" " con.m.7s,rg.	1911	J. & D.	66	65	5,000
*P.& N.Y.C.,7s,R.C.	1896 / 1906	J. & D.	116	115	6,000
*Pa Canal, 6s. cp.	1910	J. & J.	.....	63	.....
*Schuyl.Nav.,1st m. 6s. rg	1897	M. & Q.	.....	.....	.....
*Sus.Coal, 6s, rg	1911	J. & J.	87¼	87	15,000
†Balt.&O. RR., 6s.	1880	J. & J.	100¾	.....	300
" " " 6s.	1885	A. & O.	106	.....	3,500

Total transactions for the week $969,450

* Assented. † $463,000 assented, selling at from 78½@80¾. ‡ $197,000 assented, selling at from 44¼@49½. § $7,000 assented, selling at from 57@53.

COAL STOCKS.

NAME OF COMPANY.	Capital Stock.	SHARES. No.	SHARES. Par Val.	Last Dividend. Mo.	Last Dividend. Y.	Last Dividend. A't.	Rate per Ann.	Quotations of New York stocks are based on the equivalent of $100. Philadelphia prices are quoted, so much per share. Jan. 18. H.	Jan. 18. L.	Jan. 20. H.	Jan. 20. L.	Jan. 21. H.	Jan. 21. L.	Jan. 22. H.	Jan. 22. L.	Jan. 23. H.	Jan. 23. L.	Jan. 24. H.	Jan. 24. L.	SALES.
	$		$				Per c'nt													
Consol. Coal.	10,250,000	102,500	100	Jan.	77	2½	....													
Del. & H. C.	21,000,000	200,000	100	Aug	76	4	9	43⅜	41¼	42⅛	41	43¼	42	44⅛	43¼	44⅞	43⅜	45¼	44¼	10,538
D., L. & W. R.R.	26,000,000	524,000	50	July	76	2½	5	48⅜	47¼	49¾	48	5 8¾	48¾	52⅛	50⅝	53	51¾	53⅞	51¾	259,764
Lehigh C. & N.	[illegible]	208,971	50	Nov	76	1½	5½	15¾	15⅜	16	15⅞	16	15⅞	16⅛	16⅛	16	16	16⅛	15¾	4,104
Leh. V'y R. R	27,228,855	540,858	50	Dec	78	1	4	35¾	35¼	36	35⅞	36	35¾	36¼	36	36	36	36¾	36¼	3,707
Maryl'd Coal	4,400,000	44,000	100	Jan.	76	1½	1½													
N. J. C. R. R.	20,600,000	206,000	100	Apr	76	2½	2½	40¼	38	41¾	38⅞	41¼	40⅛	41⅜	40½	42	40¼	42	41	52,080
Penn. Coal...	5,000,000	100,000	50	May	78	3	....													
Penn. R. R...	68,870,200	1,337,404	50	Nov	78	2	8	34½	34⅛	34½	34	34⅛	33¾	34⅜	33⅞	34	33¾	34⅛	34⅛	70,732
Ph. & R. R. R	34,278,175	685,563	50	Jan	76	42½	10	12½	12	12⅞	12⅝	13⅜	12⅜	13⅜	13	13⅛	12¾	13¼	13⅛	29,655

The Delaware and Hudson Canal Co. has paid in dividends to date $38,821,104, and the Philadelphia and Reading $43,012,497
Total Sales.. ....430,59)

Philadelphia Stocks.

PHILADELPHIA, Friday Evening, Jan. 24, 1879.

There has been a very good business in the coal stocks in this market, and those that can be strictly classed as such show an advance. Pennsylvania RR. Co. has been the leading attraction, the sales amounting to 70,732 shares, at $33¾@$34½. Philadelphia & Reading has taken the second position, with sales aggregating 29,665 shares, at $12@$13¼. Lehigh Coal & Navigation has had liberal dealings, the total shares sold amounting to 4104, at $15⅝@$16⅛. Lehigh Valley Railroad shows unusually large transactions for that stock, the sales having amounted to 3707 shares, at 35¼@36¾, the price having a steady upward tendency.

At the annual meeting of the Lehigh Valley RR. Co., on the 21st inst., it was shown that the net income of the company was in 1878, $3,729,094, and the expenses, including interest, amounted to $3,653,365, leaving a net profit of $75,729.

Gas Stocks.

NEW YORK, Friday Evening, Jan. 24, 1879.

Our predictions of a better market, made a few weeks ago, have been fully confirmed. Prices have risen this week in some instances 10 per cent., and from the beginning of the reaction fully 20 per cent.

At the Baltimore Gas-Works (Lowe process), the cost of manufacture is about 36c. per 1000 feet.

At the Scranton (Pa.) Gas-Works, we learn that a gas of from 25 to 30-candle power is manufactured at a cost of about 45 cents per 1000 feet. This gas is made by the Lowe process.

The St. John's (N. B.) Gas Co. has offered a reduction of 25 per cent on all bills paid within 20 days after presentation.

The following list of Companies in New York and vicinity is corrected weekly by GEORGE H. PRENTISS, Broker and Dealer in Gas Stocks, No. 30 Broad street, New York:

COMPANIES IN NEW YORK AND VICINITY.	Capital Stock.	Par.	DIVIDENDS. Rate per ann.	DIVIDENDS. Am. of last.	DIVIDENDS. Date of last.	QUOTATI'NS Bid.	QUOTATI'NS As'd.
	$		P. ct.				
Mutual, N. Y....	5,000,000	$100	6	1½	Oct., '78	62½	70
" Bonds...	90,000	1,000	6	3½	Aug., '78	97	102
N. York "	4,000,000	.....	8	4	May, '78	82½	86
Metrop. "	2,500,000	100	10	5	Aug., '78	100	110
" Certfs...	1,000,000	.....	7	3½	" '78	95	100
Harlem "	1,850,000	50	6	3	Feb., '78	.....	55
Manhat. "	4,000,000	50	.....‡	5	May '78	160	170
Brooklyn, Bkln.	2,000,000	50	15	5	Jan., '79	123	130
Nassau	1,000,000	25	.....‡	3	July, '78	55	65
" Certfs...	700,000	1,000	7	3½	May, '78	80	90
People's.....	1,000,000	10	....‡	3½	Jan., '76	20	30
" Certfs....	300,000	1,000	7	3½	July, '78	70	75
" Bonds....	325,000	.....	7	3½	May, '78	90	96⅓
Metrop. "	1,000,000	100	5	2½	May, '78	50	60
W'msb'g "	1,000,000	50	8	1½	July, '78	75	85
" Certfs...	1,000,000	.....	7	3½	July, '78	85	95
Cltizens'.....	1,200,000	20	....‡	3	July, '78	60	65
" Certfs...	320,000	1,000	7	3½	Apr '78	90	100
J. C., N. J.....	750,000	20	10	7½	Jan., '79	130	140
Municipal, N. Y.	466,000	50	.....	.....	.....	100	110
" Bonds..	750,000	.....	.....	.....	.....	95	...
.....	.....	...	.....	.....	.....	.....	...

Copper Stocks.

Reported by WILSON W. FAY & Co., Brokers in Mining and Miscellaneous Stocks, Room 7, Traveller Building, 31 State street.

BOSTON, Thursday Evening, Jan. 23, 1879.

The market has been quite dull during the past week, the only feature of any importance being the unlooked-for decline in Calumet Hecla after the payment of the dividend. The whole list of stocks shows a rather weak and downward tendency, though some of them are so dull and quiet that it is almost impossible to tell whether the market is weak or strong.

We have been informed that there has been a sale of 5,000,000 lbs. of Lake copper, at 15½c. per pound, and that the price is firm, at 15¾c. bid. This has given a great deal of encouragement to the parties who are most interested, and those who know most about it say they look for higher prices for ingot copper in the spring, and feel assured that the price will go no lower than at present.

Calumet & Hecla sold at 177 just before the dividend, and at 172 first sale after the dividend, and has since declined to 170, and closes.

Copper Falls sold at 1.00, but remains steady at 1 @1⅛.

Franklin sold down to 4, and closes firm at 4@4½.

Osceola is steady at 10@10½ and not particularly strong.

Pewabic quiet and unchanged.

Quincy is quite weak, there being very few bidders at 11¾, and stock offered at 12½.

Ridge is steady at 1@1¼, and no sales.

Duncan is quiet and rather weak at 3⅜@3 7-16, and sales at 3½.

International is also quiet at 35@40c., and sales at 40.

Silver Islet appears to be the steadiest stock on the list, closing firm at 41@41½, and sales from 40 up to 41.

Gold and Silver Stocks.

NEW YORK, Friday Evening, Jan. 24, 1879.

The business at the Mining Exchange is improving in quantity and quality, although the "fancies" still make the great show in totals. The San Francisco stocks have been very liberally dealt in. We note sales as follows: Bodie, 70 shares, at $9½@$8½; California, 255, at $10¼@$9¾; Consolidated Virginia, 310, at $8⅞@$8; Eureka Consolidated, 50, at 26¼; Grand Prize, 415, at $5⅝@$5; Hale and Norcross, 60, at $17; Independence, 1195, at $1.30@$1.65; Leopard, 100, at 50c.; Ophir, 100, at $35½ Sierra Nevada, 45, at $50@$49½; Consolidated Imperial, 180, at $1; Hussey, 1100, at 23@17c.; Julia, 200, at $4¼@$4⅛; Leviathan, 400, at 55@65c.; Navajo, 125, at 40@45c.; Silver Hill, 300, at $2⅝@$2¾.

The Homestake did very well for its first day on the list of the New York Stock Exchange. The total sales were 1470 shares, opening at 21½, advancing to 22¼, declining to 21¼, recovering to 21¾, with the last sale at 21½. The sales of Sutro Tunnel for the week were 1870 shares, at $3¼@$3. Ontario was very quiet, the sales amounting to but 200 shares, at $39½ @$39.

Among the more importatn stocks of the regular list, there is but little to note. The sales have been as follows: Findley, 900, at 56@53c.; Hukill, 800, at $3@$3.15; Moose, 300, at $4.20@$4.30; Plumas, 400, at $3.55; Seaton, 100, at 80c.; and Trio, 7300, at 45@48c.

In the fancies, the dealings have been as follows: American Flag, 9700, at 20@23c.; Bertha and Edith, 81,500, at 11@14c.; Buckeye, 21,600, at 22@ 11c.; Dahlonega, 13,200, at 14@16c.; Gold Placer, 16,300, at 22@18c.; Lacrosse, 27,950, at 26@32c.

The Empire Gold Mining Co. has announced a dividend of 8 c. per share, payable on the 31st inst.

The Russia Silver Mining Co., of Park County, Colo., has applied to have its stock listed at the Mining Exchange. Its capital is $600,000 divided into 60,000 shares of $10 each. It is organized under the laws of Colorado, and announces that it has no debts. Its title is a United States patent.

A letter from the superintendent of the Leadville Mining Co. says:

"We are now working quite satisfactorily, taking out about $1000 per day—fully enough to meet the requirements of the dividend, and will be doing better by the end of the week, by which time every thing will be in good working order."

Mr. T. F. Van Wagenen, the expert who reported on the Belle of Memphis mine, is the superintendent of this company, but we are informed that the arrangement is only temporary. The Belle of Memphis, it will be remembered, was taken off the list of the Mining Exchange, the Committee on Securities having reported: "The prospectus as issued by the Memphis Gold & Silver Mining Company is entirely at variance with the facts in relation to the mine."

The Plumas Company has issued its statement for 1878, from which we glean the following: The gross product for the year was $155,784.26, and expenses, $59,598.84, leaving as net earnings $96,185.42, out of which dividends amounting to $90,400 were paid, leaving a surplus of $5785.42. In the months of August, September, and October about $4000, part of the cost of erecting 10 stamps, was charged to working expenses, while the dead-work was much greater at the end of the year than at the beginning. The two first dividends were $5400 each, then six of $7200 each, followed by three of $9000 and one of $9400. This mine is steadily growing in favor, and from the frank manner in which the management treats the stockholders and the encouraging developments on the property, its popularity must continue to increase.

The Homestake mine has been admitted to the regular list of the New York Stock Exchange. We have made frequent mention of this wonderful mine. Our private advices conform to information furnished by the company. The following is the official statement furnished the Committee on Stock List of the New York Stock Exchange:

"The Homestake Mining Company was incorporated under laws of California, November 5th, 1877. Capital, 100,000 shares, par $100, $10,000,000. Property located in Whitewood Mining District, Lawrence County, Dakota Territory, consisting of Homestake and Golden Star mines, 1350 long by 450 feet wide on the vein. Title complete. Improvements—New 80-stamp mill, fully equipped, hoisting works, air compressors, tramways, tools, sawmills, offices, and houses. Value, $250,000. Receipts to January 1st, 1879, $475,500; expended in development, construction, etc., $387,000; balance, January 1st, 1879, $88,500. Present capacity of mill, 175 tons per day. Mine can supply 500 stamps. Ore in sight sufficient to run present mill 10 years. A new mill with 120 stamps has been ordered to be completed in June next. When completed, the crushing capacity will be over 400 tons per day. No debts, liens, or incumbrances of any kind or nature. New York Office, 31 Broad street. Transfer Office, Wells, Fargo & Co., 65 Broadway. Registered by Union Trust Company. Officers: President, Lloyd Tevis; Vice-President, R. P. Lounsbery; Treasurer, J. B. Haggin; Secretary, J. K. Goodrich; Assistant Secretary, H. B. Parsons. Directors: Lloyd Tevis, J. B. Haggin, R. P. Lounsbery, Thos. Bell, M. L. McDonald, Wm. Willis."

As announced in our last, the company will pay a first dividend of 30c. per share to-morrow. This, continued monthly, would be equal to about 17 per cent per annum upon the present selling price of the stock, which rate of dividend will be continued until the new mill is completed in June, when the dividend should be increased to from 50c. to 75c. per month. The cost of mining and milling the ore of this mine is very low, and would not be much decreased by the proposed extension of the Northern Pacific Railroad one hundred miles, or to within 75 miles of the property; but it would enable the company to erect additional stamps at greatly reduced cost. From the nature of the company's ore-deposit, the supply for a number of years will prove as reliable as that of a coal or iron mine; while it will have the great advantage of a steady, profitable price for the product. A few more mines of this class will make mining investments so popular in the East that the mining fever will probably become epidemic.

The Bonanza mine of the Frisco district, Utah, is to be stocked and placed on the Eastern market. The leader in this movement is Mr. Jay Cooke, of Philadelphia, who has associated with him some leading Philadelphia capitalists. A part of the scheme contemplates the construction of 150 miles of railroad Of this, the Salt Lake *Tribune* says:

"Every thing has now been completed for the extension of the Utah Southern Railroad from York to Chicken Creek, a distance of thirty miles, and for the construction of a new road from that point to Frisco, a distance of about 130 miles. Jay Cooke heads the new company, and work is to be commenced as soon as the frost is out of the ground. Yesterday all the papers were signed, and 10 per cent of the capital was paid up by Mr. Cooke. The bonanza kings of Frisco, Messrs. Cullen, Campbell & Co., hold a one-fourth interest, and the remainder is subscribed for by men of means, and with energy enough to push the road through to the objective point in a short time."

The experts employed by Mr. Cooke, and also our correspondent, who visited the mine, estimate the quantity of ore in sight by the hundreds of thousands of tons.

Mining companies desirous to list their properties at the New York Stock Exchange can, in the case of such properties being desirable ones, do so upon paying the cost of expert examination of their books and mines. This is the decision of the Governing Committee of the Exchange.

REVIEW OF THE SAN FRANCISCO MARKET.

With but few exceptions, the San Francisco list is barely maintained. The prices of the last few days generally exhibit an improvement compared with those prevailing on the first of the week, and, on the whole, the market is firm.

Alpha is unchanged.

Alta is lower. The north drift on the 1250 level of this mine is now running in Benton ground.

Belcher shows quite a decline. The face in the

GENERAL MINING STOCKS.

Dividend Paying Mines.

NAME AND LOCATION OF COMPANY.		Feet on Vein.	Capital Stock.	SHARES. No.	SHARES. Par Val	ASSESSMENTS. Total levied to date.	ASSESSMENTS. Date and amount per share of last.	DIVIDENDS. Total paid to date.	DIVIDENDS. Last Dividend.	DIVIDENDS. Rate p. An	HIGHEST AND LOWEST PRICES PER SHARE IN CURRENCY AT WHICH SALES WERE MADE. Jan. 18. H.	Jan. 18. L.	Jan. 20. H.	Jan. 20. L.	Jan. 21. H.	Jan. 21. L.	Jan. 22. H.	Jan. 22. L.	Jan. 23. H.	Jan. 23. L.	Jan. 24. H.	Jan. 24. L.	SALES.
Alps	Nev.	800	.....	30,000	.....	204,000	Aug. 1878 $1 00	37,500	Apr. 1876 $0 05	...	...	...	...	...	...	...	...	...	...	...	...	...	.....
Belcher, G. S.	Nev.	1,040	10,400,000	104,000	100	1,392,200	Oct.. 1878 1 00	15,397,200	Apr. 1876 1 00	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Bobtail, G.	Col.	2,500	1,136,630	227,326	5	*	.....	56,831	Nov. 1877 25	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Bobtail Tunnel, G.	Col.	.....	100,000	20,000	5	52,000	July 1873 0 30	48,000	June 1878 50	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Bodie, G.	Cal.	.....	5,000,000	50,000	100	25,000	Feb. 1878 0 50	750,000	Dec. 1878 1 00	....	9½	....	9½	9¼	....	....	....	....	8½	....	....	....	70
California, G. S.	Nev.	600	54,000,000	540,000	100	.....	.....	29,700,000	Dec. 1878 1 00	....	10¾	....	10	....	10	....	9⅝	....	10½	9¾	10	9¾	255
Calumet & Hecla, C.	Mch	.....	2,000,000	80,000	25	1,200,000	.....	13,450,000	Aug. 1878 5 00	....	172	....	172	171¾	171	170¾	170⅝	170	170⅝	170	....	....	224
Central, C.	Mch	.....	500,000	20,000	25	100,000	June 1862 0 65	1,260,000	Feb. 1877 5 00	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Chollar Potosi, G. S.	Nev.	1,400	2,800,000	28,000	100	1,750,000	Sept. 1878 5 00	3,080,000	Feb. 1872 1 00	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Copper Falls, C.	Mch	.....	1,000,000	20,000	50	535,000	May. 1876	100,000	Nov. 1871 1 00	....	....	....	1	....	....	....	....	....	....	....	....	....	150
Cons. Virginia, G. S.	Nev.	710	54,000,000	540,000	100	474,600	June 1873 3 00	40,500,000	June 1878 1 00	....	8⅞	8⅝	8½	8⅜	8¾	8⅝	8¼	...	8¼	8	8⅛	8	310
Confidence, G. S.	Nev.	130	2,496,000	24,960	100	256,320	Apr. 1878 0 50	78,000	May. 1865 8½	...	....	....	....	....	....	....	....	....	....	....	....	....	.....
Cons. Her. & Roe	Col.	16,500	1,000,000	100,000	10	*	.....	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Crown Point, G. S.	Nev.	600	10,000,000	100,000	100	1,973,370	Dec.. 1878 1 00	11,588,000	Jan.. 1875 2 00	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Daney	Nev.	2,000	.....	108,000	.....	91,800	Nov. 1878 0 20	56,000	July 1863	....	....	....	....	....	....	....	....	....	....	....	26½	....	50
Eureka Cons., G. S. L.	Nev.	.....	5,000,000	50,000	100	100,000	May. 1876 1 00	3,400,000	Dec 1878 3 00	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Eureka G. Mg., G.	Cal.	1,680	2,000,000	20,000	100	.....	.....	2,149,000	Apr. 1878 0 25	..	....	....	....	....	....	....	....	....	....	....	....	....	.....
Findley, G.	Geo.	.....	200,000	200,000	1	.....	.....	30,000	Jan.. 1879 10	....	....	....	56c	53c	55c	....	....	....	....	....	54c	....	90
Franklin, C.	Mch	.....	500,000	20,000	25	360,000	June 1876 5 00	585,000	Nov. 1871 1 00	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Gila	Ariz	.....	.....	100,000	.....	50,000	Aug. 1878 0 25	50,000	Aug. 1875 0 25	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Gould &Curry, G. S.	Nev.	612	10,800,000	108,000	100	2,828,000	Nov. 1878 1 50	3,826,800	Oct. 1870 10 00	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Grand Prize	Nev.	1.500	.....	100,000	.....	100,000	July. 1878 1 00	400,000	Feb. 1878 1 00	..	....	....	4⅝	....	5⅜	....	5	....	4½	....	....	....	415
Hale & Norcross, G. S.	Nev.	400	11,200,000	112,000	100	2,970,000	Dec. 1878 0 50	1,598,000	Apr. 1871 5 00	....	....	....	....	....	....	....	....	....	....	....	17	....	60
Homestake, G.	Dak	.....	10,000,000	100,000	100	.....	.....	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	22½	21¼	1,470
Hukill, G. S.	Col.	3,288	1,000,000	100,000	10	*	.....	.....	Dec. 1878 0 10	....	3.15	3	....	....	....	....	....	....	3.10	....	3.15	3.10	800
Independence	Nev.	1,500	.....	100,000	.....	75,000	Feb.. 1878 15	150,000	Nov. 1878 25	....	1.30	.....	1.45	.....	1.60	1.50	1.65	1.60	1.60	.....	1.60	..	1,195
Kentuck, G. S.	Nev.	95	3,000,000	30,000	100	300,000	Aug. 1878 1 00	1,252,000	Mar. 1870 5 00	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
K. K Cons.	Nev.	.....	.....	50,000	.....	30,000	Jan.. 1879 1 00	50,000	Sept. 1873 0 25	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Leeds	Uth.	3,000	.....	60,000	.....	.....	.....	78,000	Oct.. 1878 0 15	....	....	....	....	....	....	....	....	....	....	....	....	....	100
Leopard, L. G. S.	Nev.	1,500	5,000,000	50,000	100	200,000	Jan.. 1879 50	162,500	Dec. 1876 0 50	....	....	....	50c	....	....	....	....	....	....	....	....	....	.....
Manhattan	Nev.	.....	.....	50,000	.....	50,000	Oct.. 1878 1 00	400,000	Feb. 1877 1 00	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Merrimac, G. S.	Mas.	1,500	500,000	100,000	5	*	June	120,000	Mar.	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Minesota, C.	Mch.	.....	1,000,000	20,000	50	436,000	..... 1869 1 00	1,820,000	Mar. 1876 0 50	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Modoc	Cal.	4,000	.....	100,000	.....	400,000	Nov. 1878 0 50	50,000	Dec. 1876 0 50	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Moose	Col.	39,000	2,000,000	200,000	10	*	.....	550,600	Mar. 1878 0 25	....	4.20	.....	4.30	.....	....	....	....	....	....	....	....	....	300
National, C.	Mch.	.....	500,000	20,000	25	195,000	Oct.. 1875 1 00	360,000	Oct. 1873 1 00	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
N. Y. & Colorado, G.	Col.	.....	1,000,000	50,000	20	*	.....	20,000	Mar. 1877 0 20	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Northern Belle, S.	Nev.	1,600	5,000,000	50,000	100	.....	.....	1,425,000	Feb. 1878 1 00	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Ontario..	Uth.	3,000	10,000,000	100,000	100	.....	.....	1,950,000	Jan. 1879 50	....	....	....	39½	....	....	....	39	....	....	....	....	....	200
Ophir, G. S.	Nev.	675	10,080,000	100,800	100	3,436,800	Nov. 1878 1 00	1,394,400	Mar. 1864 4 00	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Pewabic, C.	Mch.	.....	500,000	20,000	25	185,000	June 1868 3 00	460,000	July 1873 1 00	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Phoenix, C.	Mch.	.....	1,000,000	20,000	50	817,500	Sept. 1870 3 00	10,000	Dec. 1876 1 00	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Plumas	Cal.	.....	1,000,000	100,000	10	.....	.....	110,000	Jan. 1879 10	....	3.55	...	3.55	....	....	....	....	....	....	....	....	....	400
Quincy, C.	Mch.	.....	200,000	20,000	10	.....	.....	2,240,000	Feb. 1878 5 00	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Raymond & Ely, G. S.	Nev.	5,000	3,000,000	30,000	100	730,000	Jan.. 1879 1 00	3,075,000	Sept. 1873 3 00	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Ridge, C.	Mch.	.....	500,000	20,000	25	200,000	.....	90,000	Feb. 1875 1 00	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Rye Patch	Nev.	1,600	.....	30,000	.....	157,500	Dec.. 1878 1 00	105,000	Dec. 1877 0 25	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
St. Joseph, L.	Mo.	2,000 acs.	1,000,000	100,000	10	.....	.....	250,000	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Savage, G. S.	Nev.	800	11,200,000	112,000	100	4,084,500	Dec. 1878 1 00	4,460,000	June 1869 3 00	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Seaton, G. S.	Col.	1,700	500,000	50,000	10	*	.....	.....	May 1877 0 10	....	....	....	80c	....	....	....	....	....	....	....	....	....	100
Sierra Nevada, G. S.	Nev.	3,650	10,000,000	100,000	100	2,350,000	Oct.. 1878 3 00	102,000	Jan. 1871 1 00	....	....	....	....	....	....	....	....	....	....	....	50	49½	45
Silver Islet	Mch	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	....	40	.....	40½	....	....	....	....	....	....	....	45
Silver King	Ariz	.....	.....	.....	.....	.....	.....	450,000	Nov 1878 0 50	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Standard	Cal.	.....	.....	50,000	.....	50,000	July 1878 1 00	800,000	Dec . 1878 1 00	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Yellow Jacket, G. S.	Nev.	1,200	12,000,000	120,000	100	3,798,000	Sept. 1878 1 00	2,184,000	Aug. 1871 2 50	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
McClinton	Cal.	1,000	.....	60,000	.....	45,000	Dec.. 1878 0 25	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....

Non-Dividend Mines.

A'louez, C.	Mch.	.....	1,000,000	20,000	50	940,000	May 1876 5 00	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	.....
Alpha, G. S.	Nev.	306	3,000,000	30,000	100	240,000	Mar. 1878 1 00	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Alta	Nev.	600	.....	108,000	.....	993,000	Dec. 1878 1 00	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Am. Flag, G.	Col.	5,300	600,000	60,000	10	*	.....	.....	.....	.....	....	....	21c	20c	21c.	20c	21c.	20c	23c	20c	23c	20c	9,700
Andes	Nev.	2,000	.....	100,000	.....	355,000	Oct 1878 0 25	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Baltimore Cons.	Nev.	1,050	.....	84,000	.....	1,015,000	Apr. 1878 0 50	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Benton	Nev.	600	.....	108,000	.....	91,800	Dec. 1878 0 50	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Bechtel	Cal.	.....	.....	60,000	.....	75,000	Nov. 1878 0 25	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Bertha & Edith. G.	Vir.	645 acs.	500,000	500,000	10	*	.....	.....	.....	.....	13c	11c	13c	11c	13c	11c	12c	11c	13c	11c	14c	12c	81,500
Best & Belcher, G. S.	Nev.	545	10,080,000	100,800	100	538,590	Jan.. 1879 1 00	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Boyle	Nev.	600	.....	108,000	.....	16,240	Aug. 1878 0 15	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Buckeye	Col.	.....	2,000,000	400,000	5	*	.....	.....	.....	.....	....	....	22c	.....	16c.	12c	11c.	12c	14c	12c	13c	11c	21,600
Bullion, G. S.	Nev.	943¼	10,000,000	100,000	100	3,002,000	Dec. 1878 1 00	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Caledonia, G. S.	Nev.	2,188	10,000,000	100,000	100	1,540,000	Nov. 1878 0 50	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Cashier	Col.	.....	500,000	250,000	2	*	.....	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Challenge	Nev.	90	.....	50,000	.....	10,000	Nov. 1878 0 20	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Cleveland, G	Col.	3,715	250,000	25,000	10	*	.....	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	1	189
Cons. Imperial, G. S.	Nev.	468	50,000,000	500,000	100	775,000	Sept. 1878 0 20	.....	.....	.....	1	....	....	....	....	....	....	....	....	....	....	....	....	.....
Con. N. Slope & E. T.C.	Col.	15,000	500,000	10,000	50	.....	.....	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Dahlonega	Ga.	.....	250,000	250,000	1	.....	.....	.....	.....	.....	13c	....	14c	.....	15c	14c	15c	14c	15c	....	16c	15c	13,200
Dana, C.	Mch.	.....	500,000	20,000	25	68,000	Jan.. 1863 0 50	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Dawson, S.	Ont.	.....	1,200,000	60,000	20	.....	.....	1878	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Day	Nev.	1,500	.....	100,000	.....	55,000	Sept. 1878 0 25	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Dayton	Nev.	1,600	.....	100,000	.....	75,000	Apr. 1878 0 25	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
De Frees	Ariz	1,500	.....	100,000	.....	115,000	Oct.. 1878 15	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Duncan, S.	Ont.	.....	1,200,000	60,000	20	75,000	July 1876 41⅔	.....	.....	.....	3½	....	....	....	....	....	....	....	3½	....	....	....	200
Exchequer, G. S.	Nev.	400	10,000,000	100,000	100	380,000	Jan.. 1878 1 00	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Gold Placer, G.	Col.	.....	5,000,000	200,000	25	.....	.....	.....	.....	.....	19c	....	22c	19c	21c	20c	20c	....	20c	19c	20c	18c	16,300
Granville, G.	N. C.	357 acs.	1,000,000	100,000	10	*	.....	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Humboldt, C.	Mch.	.....	500,000	20,000	25	100,000	Sept 1878 0 15	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Hussey	Nev.	4,500	.....	100,000	.....	95,000	Oct.. 1878 0 25	.....	.....	.....	....	....	....	....	21c	20c	23c	17c	20c.	19c	....	....	1,100
International, S.	Ont.	.....	1,200,000	60,000	20	.....	.....	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	4¼	4⅛	200
Julia, G. S.	Nev.	3,000	11,000,000	110,000	100	745,000	Nov. 1878 1 00	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Justice, G. S.	Nev.	2,100	10,500,000	105,000	100	2,703,500	Jan.. 1879 1 00	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
King's Mountain, G.	N. C.	.....	1,200,000	120,000	10	*	.....	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Kossuth	Nev.	2,700	.....	108,000	.....	421,200	Aug. 1877 0 15	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Lacrosse	Col.	3,900	1,000,000	100,000	10	*	.....	.....	.....	.....	28c	26c	31c	28c	31c	28c	....	....	30c	29c	32c	30c	27,950
Leviathan	Nev.	2,000	.....	100,000	.....	240,000	May. 1878 05	.....	.....	.....	....	....	55c	....	65c	60c	....	....	....	....	....	....	400
Luzerne	Col.	4,200	5,000,000	500,000	10	*	.....	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Madison, C.	Mch.	.....	500,000	20,000	25	123,000	Sept 1876 0 10	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Mariposa preferred.	Cal.	44,387	5,000,000	50,000	100	1,425,000	June 1877 1 00	.....	.....	.....	2½	....	....	....	....	....	....	....	....	....	....	....	10
" common	Cal.	acres.	10,000,000	100,000	100	1,425,000	June 1878 1 00	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
McCracken	Ariz	4,500	.....	100,000	.....	100,000	Oct . 1878 0 50	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Martin White	Nev.	.....	.....	100,000	.....	650,000	Dec. 1878 1 50	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Mesnard, C.	Mch.	.....	500,000	20,000	25	160,000	Apr. 1876 0 50	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Mexican, G. S.	Nev.	600	10,080,000	100,800	100	217,400	May. 1878 0 50	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Minnietta Belle	Cal.	1,500	.....	100,000	.....	75,000	Apr. 1878 0 50	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Mt. Bross Tunnel	Col.	8,600	2,000,000	200,000	10	*	1878	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Navajo	Nev.	1,500	.....	100,000	.....	125,000	May 1878 0 25	.....	.....	.....	....	....	....	....	40c	....	45c	40c	....	....	....	....	125
New York	Nev.	1,000	.....	100,000	.....	700,000	Nov. 1878 0 30	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Occidental	Nev.	1,706	.....	40,000	.....	72,500	Feb. 1877 0 25	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Orig. Keystone	Nev.	1,500	1,000,000	100,000	10	50,000	Oct. 1878 0 50	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Overman, G. S.	Nev.	1,200	3,840,000	38,400	100	3,404,280	Sept. 1878 3 00	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Osceola, C.	Mch.	.....	1,000,000	40,000	25	2,567,880	Nov. 1877 3 00	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Petherick, C.	Mch.	.....	500,000	20,000	100	165,533	Mar. 1876 0 50	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Pleasant View, G.	Col.	1,200	200,000	20,000	10	*	.....	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Quicksilver preferred.	Cal	8,500	4,291,300	42,913	100	*	.....	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	.....
" common	Cal.	acres.	5,708,700	57,087	100	.....	.....	.....	.....	.....	....	....	....	....	12	....	....	....	14	.....	15	14	800
Rockland, C.	Mch	.....	500,000	20,000	25	495,000	Jan.. 1874 1 00	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Seg. Belcher, G. S.	Nev.	160	640,000	6,400	100	244,800	Apr. 1876 5 00	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Silver Hill, G. S.	Nev.	5,400	10,800,000	108,000	100	1,350,000	Jan.. 1879 0 50	.....	.....	.....	....	....	....	....	....	....	....	....	2⅜	....	2⅜	....	300
Silver Prize	Nev.	1,500	.....	100,000	.....	40,000	Nov. 1878 0 15	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Star, C.	Mch.	.....	500,000	20,000	25	265,000	Mar. 1876 0 50	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Superior, C	Mch.	.....	500,000	20,000	25	340,000	Mar. 1878 0 25	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Sutro Tunnel	Nev.	.....	20,000,000	2,000,000	10	.....	.....	.....	.....	.....	3	....	.....	.....	3¼	....	.....	....	3¼	3	3	.....	1,870
Tip-top	Ariz	.....	.....	100,000	.....	120,000	July 1878	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Tioga	Cal.	1,500	.....	100,000	.....	60,000	Dec. 1878 0 20	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Tr[illegible]	[illegible]	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	....	....	....	45c	....	....	....	....	....	48c	46c	7,300
Trojan	Nev.	1,500	.....	100,000	.....	240,000	Oct. 1878 0 25	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Tuscarora	Nev.	.....	.....	100,000	.....	20,000	Nov. 1878 0 05	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Union Cons. G. S.	Nev.	.....	10,000,000	100,000	100	310,000	Apr.. 1874 0 25	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Utah	Nev.	1,000	.....	20,000	.....	720,000	Dec. 1878 2 00	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Ward	Nev	1,200	.....	110,000	.....	99,000	Jan.. 1879 0 30	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Wells Fargo	Nev.	1,500	.....	108,000	.....	216,000	Sept. 1878 0 50	.....	.....	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	.....

G. Gold. S. Silver. L. Lead. C. Copper. * Non-Assessable. +4 15 16.

Total Assessment levied to date $63,512,313

Total Dividends paid to date $152,219,231

Total Sales for the week ..... 189,924.

SAN FRANCISCO MINING STOCK QUOTATIONS.

Daily Range of Prices for the Week.

NAME OF COMPANY	CLOSING QUOTATIONS						Opening.
	Jan. 17.	Jan. 18.	Jan. 20.	Jan. 21.	Jan. 22.	Jan. 23.	Jan. 24.
Alpha	14⅛	12⅛	13	13	13⅛	15	14¼
Alta	7⅞	7½	7⅝	7⅞	8¼	8¼	8
Argenta	....	....	....	....	....	....	....
Bechtel	....	....	....	....	....	....	....
Belcher	5¼	5	5	4¾	4½	4½	4½
Belle Isle	....	....	....	....	....	....	....
Benton	....	....	....	....	....	....	....
Best & Bel	22¼	22⅜	23	22⅝	21⅝	21¾	22
BlackHawk	....	....	....	....	....	....	....
Bodie	8¾	8⅝	8	8¼	8	7½	....
Booker	....	....	....	....	....	....	....
Bullion	9	8½	8⅞	8	8¼	8¾	8½
Bulwer	....	....	....	....	....	....	....
Caledonia	3¼	3	3	3½	3	3⅛	3
California	9¾	9½	9¾	9½	9½	9⅝	9⅝
Challar-Pot	51	48	48¾	47½	47	49	48½
Confidence	....	....	....	....	....	....	....
Con. Imp	....	....	....	....	....	....	1.10
Con. Va	8½	8¼	8⅝	8¼	8	8	8
Crown P'int	6⅛	5⅞	5¾	5½	5	5½	....
Endowm'nt	....	....	....	....	....	....	....
Eureka Con	28¾	28¾	26½	26	26	27	....
Exchequer	6⅛	6	5⅞	5½	5⅞	6⅛	6¼
Goodshaw	....	....	....	....	....	....	....
Gould &Cur	14⅛	14	14	13⅜	13½	13¾	13⅜
Grand Prize	4	4¼	4¾	4½	4⅛	4⅜	....
Hale & Nor.	18½	16½	18¼	16⅞	17⅛	17⅛	17¼
Hamburg	....	....	....	....	....	....	....
Homestake	....	....	....	....	....	....	....
Hussey	....	....	....	....	....	....	....
Indep'd'nce	....	....	....	....	....	....	....
Jackson	....	....	....	....	....	....	....
Julia Con	5	4¼	4	3½	3¾	3¾	3½
Justice	4¼	4¾	4⅛	4½	4	4¼	5½
Kentuck	....	....	....	....	....	....	5⅝
Kossuth	....	....	....	....	....	....	....
Leopard	....	....	....	....	....	....	....
Leviathan	....	....	....	....	....	....	....
Manhattan	....	....	....	....	....	....	....
McClinton	....	....	....	....	....	....	....
MeadowVal	....	....	....	....	....	....	....
Mexican	34¼	34¼	33¾	33	33¼	35	*
Mono	....	....	....	....	....	....	....
Navajo	....	....	....	....	....	....	....
North. Belle	7	6	6	6⅝	7	6½	....
Ophir	35¾	35	35	33½	34	34¾	34½
Orig. K'ys'e	....	....	....	....	....	....	....
Overman	11⅞	11⅜	11¾	10⅞	10½	10⅞	11
P. Sheridan	....	....	....	....	....	....	....
Ray. & Ely	6½	5¾	6¼	7	6¾	7	....
Richer	....	....	....	....	....	....	....
Savage	15	14	15¼	14⅞	14¾	14⅜	14½
Scorpion	1⅜	....	....	1⅜	1¼	....	....
Seg.Belcher	....	....	....	....	....	....	23
Sierra Nev.	48½	48½	48	44¾	45	47¾	48a50
Silver Hill	....	....	....	....	....	....	2½
Silver King	....	....	....	....	....	....	....
Summit	....	....	....	....	....	....	....
Tioga	....	....	....	....	....	....	....
Tip Top	....	....	....	....	....	....	....
Union Con.	60½	59	59¾	58½	58	59½	60
Utah	19	18	18¼	16	17⅛	19	18½
Ward	....	....	....	....	....	....	....
WashoeCon	....	....	....	....	....	....	....
Wells Fargo	....	....	....	....	....	....	....
Yel. Jacket	22¼	19¾	20½	20	19½	20¼	19¾
....	....	....	....	....	....	....	....	....
....	....	....	....	....	....	....	....	....
....	....	....	....	....	....	....	....	....

* 36½@35⅛.

main south drift on the 2360 level of this mine is reported as in very favorable ground.

Best & Belcher is steady. The flow of water at the Osbiston shaft continues very strong. In fact, more water is being raised there than at the C. & C. shaft, or at any other one point along the lode. It is thought that this shaft is draining the whole eastern part of the lode.

Bullion is somewhat lower. The north drift on the 2000 level of this mine and the shaft will soon be connected, and a good ventilation of the mine to that depth attained.

Bodie is down, closing yesterday at $7½ per share, against $8⅝ a week ago. This company is making very satisfactory bullion shipments.

Bulwer is closely held in San Francisco at from $14 to $15 per share. The ledge in the south drift of this mine is 18 inches in width and of very good ore. Stonewall stopes continue to look well. There are over 600 tons of ore at the Bodie mill.

Caledonia is somewhat lower; active operations are being prosecuted in this mine.

About 75 tons of ore are being daily extracted from the Consolidated Virginia mine, and 350 tons from the California. The quotations of these stocks are barely maintained.

The California Mining Company held its annual meeting in San Francisco on the 8th inst. From the published report we condense the following concerning the operations of the company during the past year. The superintendent says:

"The California mine has yielded during the year ending December 31st, 1878, 134,887 tons, 1773 pounds of ore. There remained on hand on the first of January, 1878, in the ore houses and at the mills, 5009 tons, 150 pounds; making a total of 139,896 tons, 1923 pounds. Of this ore, 138,785 tons, 1300 pounds have been reduced; leaving on hand in the ore houses and at the mills, 1111 tons 623 pounds, valued by assay at $64,385.62. The ore reduced has yielded bullion of the value of $10,949,078.93, or $78.89 per ton; this yield being 72½ per cent of the assay value of the ore. The value of the gold in this bullion was $5,553,404.38, and of the silver, $5,395,674.55.

"In addition to the ore which was extracted, there have been raised from the mine, in the past year, 22,693 tons of waste rock.

"The lateral drifts, cross-cuts and winzes, which have been run in and through the different levels of the mine secure a general good ventilation and form a complete base from which we can now continue the extraction of ore from the productive levels, and carry on the work of developing the new lower levels. Leaving the two upper levels (the 1500 and 1550-foot levels) out of consideration, there still remain in sight in the other productive levels blocks of good ore, and it is not unreasonable to suppose that the low-grade ore which exists there may improve on further exploration; and portions of these levels remain entirely unexplored and are yet to be prospected. It must be recollected that the three lower levels, particularly the 1950 and 2150-foot levels, have only begun to be opened, and that there is here a large extent of ground to be prospected. So far as we have advanced into these levels, the formation appears favorable, and already a seam of ore, yielding fine assays, has been reached in the main drift on the 1950-foot level. This seam has been followed for more than 100 feet, and it lies fully 60 feet east of the main ore vein. We are encouraged to hope for renewed prosperity to the mine, not only from the indications visible in itself, but also from the important fact that ore developments have been made in the Comstock vein considerably deeper than our present workings, notably in the case of the Sierra Nevada mine, where the top of the late ore development is 200 feet deeper than our 2150-foot, or lowest, level."

Consolidated Imperial shows an improvement. Recent information from this mine says that the bottom of the south winze below the 2400 level still continues in a mixture of quartz and porphyry. The flow of water is still light. The east cross-cut on the 2400 level from the joint Alpha winze is still advancing, the face in porphyry.

Crown Point is considerably lower, opening at 5½, against $6¾ a week ago. Sinking the double-incline winze below the 2300 level is making good headway. There is no change of value to note of any of the drifts or cross-cuts on the 2300 level.

Eureka Consolidated stock shows a marked decline, the closing quotation of yesterday showing a fall of $2 per share for the week. We have again rumors to the effect that the mine has seen its best days. An expert has passed through eleven of the levels in the mine; no one is admitted to the twelfth level, the deepest, it is feared because the ore has given out on that level. The company is now erecting an immense granite mill at an extravagant cost, which it is alleged is being done to impress outsiders.

If new ore-bodies should be found, favorable results may be anticipated from the Eureka District again during the coming year. Its large bullion product is attracting attention, and vigorous work is being done in many very promising mines in that locality.

Exchequer is well sustained.

Gould & Curry is lower.

Grand Prize shows a slight advance on the very low price recently attained. This company is making regular shipments of bullion, and the future of the mine seems promising. A rich strike in the same is reported on the 500-level.

Hale & Norcross is lower. The lightning drift on the 2200-level is now connected with the Combination shaft. The total length of this drift is 894 feet from shaft to shaft. This fact lends interest to the future of this mine, and it is thought that it will be beneficial to the Hall & Norcross Company, as well as to other adjoining mines.

We have no quotation of Independence. The stock has recently sold on the San Francisco market at $1.05 to $1.20 per share. Regarding this mine and others, a correspondent of the Boston *Commercial Bulletin* of the 18th inst. says:

"Why they will go off and put their money into such abominable swindles as this Independence, Navajo, Hussey, Leopard, Day, Argenta, Silver Prize, and all this litter of wild-cats, I can not imagine. Eastern investors must learn to discriminate. And right here let me give them a hint. Never buy a stock unless they know who is controlling it. The men who control a property are the men to be looked after. A mine may be as promising as any in the world, and yet if the public have no confidence in the managers, it is a bad stock to buy. This Independence is a case in point."

Julia is notably lower, opening to-day at $3½ against $5 a week ago. This mine is said to have reached quartz of very fine appearance, in a drift on the 2000 level, which shows a considerable amount of metal and appears to lead up to something better. The south branch of the Sutro Tunnel is rapidly approaching the Julia shaft, and if nothing serious happens to prevent, will complete a connection in three or four weeks more, when no further trouble with the water will be experienced.

Justice shows some improvement; this mine is yielding 40 tons of ore per day. This is mostly taken from the 1100 and 1250 levels. The Papoose mill is kept steadily employed on ore from the mine. The prospecting drifts and winzes on the lower levels are all being pushed vigorously forward without any new or important features to report.

Mexican opens at $35½, an advance of $2 for the week.

Ophir is lower; the daily yield is 70 tons of ore.

Raymond & Ely shows a marked advance, it is intimated that a combination is to be formed, for the purpose of depressing this stock. We note in this connection the following order from the court:

"Judge Dwinelle, of San Francisco, has made an order requiring the Directors of the Raymond & Ely Mining Company to show cause, on Friday, the 24th instant, why an assessment levied on the capital stock of the company, on the 7th instant, of one dollar per share, should not be declared void and set aside, on the ground that the levy of the assessment was not necessary, and that it was made for the purpose of depreciating the market value of the stock, to give them an opportunity to buy it in for their own benefit, as alleged in a complaint filed in the Fifteenth District Court by C. P. Wertheimer, on behalf of himself and other stockholders, for the purpose of setting aside said assessment."

A meeting of the company has been called for the purpose of deciding upon increasing the capital stock of the company from $6,000,000 to $12,000,000, and the shares of stock from 30,000 to 120,000 shares. On the tenth level of this mine the upraise is said to be in vein of high-grade ore, though the ore is quite hard.

Sierra Nevada has fluctuated considerably during the week, but opens to-day at improved prices. The mine is reported as looking very well. The annual meeting of this company was held on the 9th inst. The superintendent, in his report, expresses the belief that the ore body is widening as it goes down, and entertains a favorable opinion of the prospects of the mine. The company has been at considerable expense in enlarging the machine and carpenter-shop building, and building the foundation for the new air compressor, which is expected shortly. The secretary's report shows receipts of $550,000 from assessments and $3440 from other sources. Total disbursements, $477,175.57. Cash on hand, $77,130.03.

The total length of the south lateral branch of the Sutro Tunnel, according to the *Gold Hill News*, is 1186 feet:

"Only about 200 feet further will carry it through to the Julia shaft. The ledge formation passed through of late has been of the most favorable working character, allowing advancement at the rate of about 100 feet a week, therefore it will not probably take more than 2 or 3 weeks longer to reach the Julia shaft. The size of this lateral branch is 12½ feet wide by 8½ feet high in the clear. The sub-drain or canal, beneath the sill floor of the main tunnel, to carry off the water from the Comstock mines, is in steady course of construction, but will not be in readiness as soon as required by the mining companies."

The *Commercial Herald* of the 16th inst. says of the market: "The past week has been characterized with an increased degree of activity in the mining share market, being the result of an advance of the general list now dealt in, which is still restricted, but is in excess of the offerings of several previous weeks. The expectant Sierra Nevada gained smartly at the close, under a not very largely increased placement over recent like reports, and this has undoubtedly stimulated an upward movement in other directions, producing a sufficiently confiding market to induce investments by those whose hope has not yet entirely given way to despair. How quickly the wild-cats jump into the arena when the aspect exhibits the least favorable opportunity to put out a few shares at the nominal prices put upon them by the watchful manipulators; and we presume they must be quite successful in operations of this kind, though not a tenth of the aggregate sales reported have actually been made. We do not think that this advance will be maintained at present—it was only necessary to keep up the courage of those whose fortunes have been lost, and who still think they may be able to regain them by the same chances they had in the past.—In our issue of the 30th inst.—which will be our annual review—we shall give full details of the mining stock sales in the San Francisco Board for the year 1878, together with an exhaustive review of the mining interests of the entire coast.

"Sierra Nevada jumped to $57, but closed at a less price. The latest from the mine is as follows: 'In extending the drill hole in the face of the north lateral drift of the Sierra Nevada, on the 2200 level, the point mentioned in the official letter of Saturday, the drill is reported to have struck ore. Enough has been done to show positively that the east clay of the vein, which at No. 1 incline trended to the northwest, has been found to the northeast. This also is shown by the fact that the winze shaft is in vein matter similar to that overlying the ore-body at the incline. The fact of this clay having a trend to the northwest has hitherto been the main reason for believing the principal portion of the ore-body to be in the Union Consolidated mine. Present developments show that the incline strikes the vein, and that the cross-cuts have run near the narrowest spot of the lode, and now the question is, what lies in the bulge at the north? This the drill is helping to solve.'"

ASSESSMENTS with dates when delinquent: Noonday, 10c., February 6th; Brilliant, 5c., February 17th; Ward G. and S. Mining Co., 30c., February 14th; Union Consolidated (Inyo), 50c., February 12th; Raymond & Ely, $1, February 12th; Derbec Gravel, 10c., February 7th; London, 5c., February 11th.

NEW YORK, January 18, 1879.

THE DIRECTORS OF THE EMPIRE GOLD MINING COMPANY have this day declared a dividend of eight cents in gold per share (par value $10) out of the net earnings for the month of December, payable at the office of the Treasurer, S. V. WHITE, No. 8 Wall street, on the 31st day of January, inst. The books to close on January 25th and re-open on February 1st, 1879.

GEO. H. HANDFORTH, Secretary.